

# Field Instruments for Process Automation

**Process Automation** 



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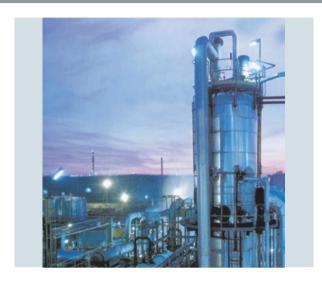






### Field Instruments for Process Automation

#### **Process Automation**



#### Catalog FI 01 · June 2015

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Refer to the Industry Mall for current updates of this catalog:

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The products contained in this catalog can also be found in the Interactive Catalog CA 01.

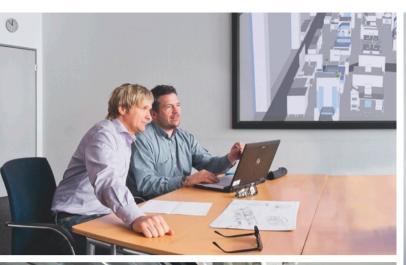
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### Answers for industry.

Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

Siemens is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility.

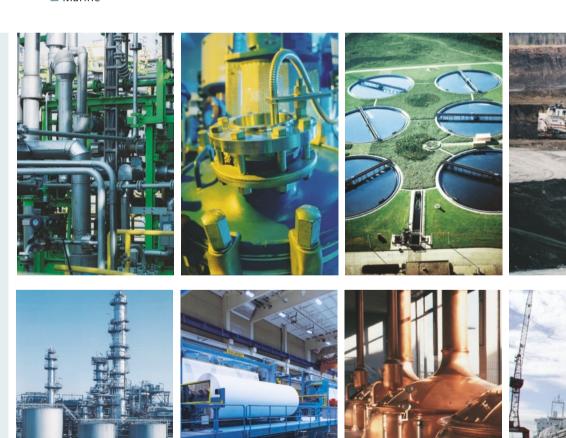
We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

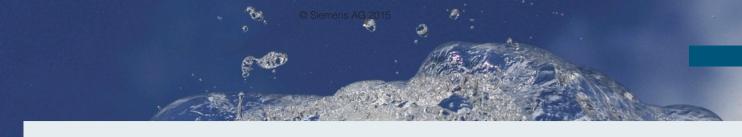
Market launch times can be reduced by up to 50% due to the combination of powerful automation technology and industrial software. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.

### **Industries**

In the field of process instrumentation, process analytics and weighing technology, Siemens focuses on a number of key industries such as:

- Chemical
- Pharmaceutical
- Water/wastewater
- Mining, aggregates, cement
- Oil and gas/hydrocarbon processing
- Pulp and paper
- Food and beverage
- Marine





### **Process Instrumentation**

Siemens offers a comprehensive range of process instruments for pressure, temperature, flow and level measurement. Pneumatic valve positioners, process controllers, process recorders and process protection devices complete the package. Whether you need a single instrument or a complete instrumentation package, Siemens is your professional supplier for any project.



### **Pressure Measurement**



SITRANS P comprises a complete range of instruments for measuring gauge, differential and absolute pressure. In addition to high measuring precision and ruggedness, defining features include the convenience and functionality of a modular system as well as the perfect safety concept. We have a proven range of products for all pressure applications.



#### SITRANS P500

Digital transmitter for high precision applications with unmachted specifications for total performance and long term stability.



#### Overview of the SITRANS P range:

#### SITRANS LH100 [1]

Convenient hydrostatic level measurement.

SITRANS LH100 submersible pressure transmitter is used for hydrostatic level measurements. It is immersed in the process connected by a vented cable. The sensor has a stainless steel enclosure and is suitable for applications ranging from drinking water to corrosive liquids.

#### ■ SITRANS P200/210/220 [2]

The fixed range transmitter for gauge and absolute pressure.

SITRANS P200: ceramic diaphragm SITRANS P210: stainless steel diaphragm

SITRANS P220: stainless steel diaphragm fully welded

#### ■ SITRANS P280 [3]

The SITRANS P280 is a WirelessHART pressure transmitter that provides all measured process values as well as diagnostic information, parameters and functions via wireless communication. The device is powered by an internal battery and designed for ultralow power consumption. The compact and rugged design makes it specially suitable for direct mounting on tanks and pipes in remote parts of plants, and on moving or rotating equipment for process monitoring or asset management applications.

#### ■ SITRANS P Compact [4]

For the special requirements of the food and beverage, pharmaceutical and biotechnology industries.

The increased hygiene demands are satisfied by a range of stainless steel process connections. Cleaning and sterilization procedures (CIP, SIP) are standard practice.

### **Pressure Measurement**





[2]

#### ■ SITRANS P300 [1]

offers measuring precision and ruggedness, and advanced operation. The SITRANS P300 was designed for the food and beverage industry as well as pharmaceutical processes. It is an integral component of the SITRANS P family because of its measurement deviation of less than 0.075 %, a hygienic stainless steel housing with laseretched nameplate, and the proven SITRANS P DS III local operating philosophy.

The SITRANS P300 meets the requirements of the EHEDG, FDA and 3A. This makes it ideal for applications in the food and pharmaceutical industries.

You can read the process data via a HART, PROFIBUS PA or Fieldbus FOUNDATION protocol. The SITRANS P300 is also available combined with absolute or relative pressure measuring cells with flush mounted diaphragms. A wide range of process connections are available for the food and beverage, pharmaceutical, and paper industries, including threaded and flanged versions.

#### ■ SITRANS P310 [2]

Digital transmitters with integrated HART diagnostic functions and convenient key operation. It complements the existing SITRANS P DS III compared to the SITRANS P DSIII as a basic model for simple measurement tasks with lower accuracy requirements.

Design variants for relative pressure and differential pressure measurements are available. Certificates such as ATEX, NEPSI, FM, CSA and SIL guarantee is use in hazardous areas as well as in processes with high safety requirements.

#### ■ SITRANS P DS III [2]

Digital transmitters with integral diagnostics function, HART, PROFIBUS PA or Fieldbus Foundation communication, and convenient key operation. Within a range from 1 mbar to 700 bar, the SITRANS P DS III works well even with extreme chemical and mechanical loads or electromagnetic influences. It offers measurement accuracy of 0.065% for the standard measuring ranges for relative and differential pressure. Furthermore it offers additional safety functions such as plant and self-monitoring, fault diagnostics and provides maintenance messages advising when the next calibration is due. The self-test function is unique for fail-safe operation. Measuring cells can be quickly and easily replaced so that on-site repairs are fast, simple and cost-effective. In addition to convenient local operation, SITRANS P transmitters can be connected to networks using the PROFIBUS PA, Foundation Fieldbus, or HART protocol.

SITRANS P DS III is designed for nominal pressures up to PN 420 (5800 psi). The wetted parts are available in stainless steel, Tantalum, Hastelloy, Monel, or gold plated. Explosion-proof versions are also available. The high safety level is documented by globally recognized certificates, including ATEX, SIL, CENELEC, FM, CSA, NEPSI. It is tested according to the NAMUR guidelines.

#### ■ SITRANS P410 [2]

Digital transmitters with built-in diagnostic functions, HART, PROFIBUS PA or FOUNDATION Fieldbus communication. It complements the existing SITRANS P DS III as its high performance variant with increased measurement accuracy of 0.04%. The design variants for relative pressure and differential pressure measurements are available as well as the current certificates of the SITRANS P DS III.



#### ■ SITRANS P500 [4]

Digital transmitters for high precision applications.

The SITRANS P500 ensures a maximum reference accuracy below 0.03% of calibrated span up to a turndown of 10:1. Combined with its low static pressure and temperature errors, it guarantees a total performance of 0.09% up to a turndown of 5:1 and 0.14% up to a turndown of 10:1.

The excellent long-term sensor stability reduces recalibration costs and gives you the measurement that you can trust on the long run. The cutting edge design of the measurement cell allows use at process temperatures up to 257 °F (125 °C) without requiring a remote seal system.

In case of critical applications where fast response times are required the SITRANS P500 helps to keep your plant safe thanks to its step response time (T63) of only 88 ms.

The configuration of the device can be done via standard HART-protocol compatible tools and also using the local push buttons and LCD display.

SITRANS P500 offers an easy-to-understand multilingual plain text menu which includes a rich set of diagnostic features and a quick start wizard for a simple, error-free configuration. The graphic display of the transmitter can be used to show trends and enables process monitoring.

This transmitter is available for different ranges to be used for differential pressure and level applications. In addition the transmitter can be combined with different kinds of remote seals.

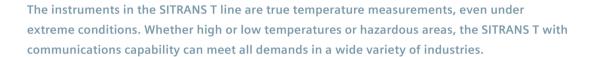
#### ■ Remote seals [5]

The measuring possibilities of the SITRANS P line are extended by a wide range of remote seals. These seals are used when measuring hot, corrosive, highly viscous, or crystallizing material. The following types of remote seals are available:

- Flanges according to EN, ASME, and other connections, either rigid connection to the transmitter or via flexible capillary.
- Various filling liquids for temperatures of material up to 400°C (750°F).
- Various diaphragm material options.
- Special versions specific to each industry.

### Temperature Measurement







**SITRANS TS500** Temperature Sensors for a wide range of applications





[2]

Whether you require a sensor, head, rail or field-mounted transmitter, or a complete measuring station – we can offer you this individually or as a complete package. The cost-effective SITRANS T transmitters can measure accurately in any application, and can be connected simply and rapidly to thermocouples or resistance thermometers. You can set the parameters using the intelligent SIMATIC PDM software package in no time at all, and without input errors. The following units are available:

#### Transmitters for head-mounting

#### ■ SITRANS TH100 [1]

Pt100 transmitter. Low-cost and compact, configurable using PC (SIPROM T).

#### ■ SITRANS TH200 [2]

Universal transmitter, configurable using PC (SIPROM T). Cost-saving service features.

#### ■ SITRANS TH300 [2]

HART universal transmitter, configurable using SIMATIC PDM or HART protocol. Cost-saving service features. Diagnostics and simulation functions, remotely or locally.

#### ■ SITRANS TH400 [2]

Fieldbus transmitter in designs for PROFIBUS PA or FOUNDATION Fieldbus.

Configurable using SIMATIC PDM (PA) or AMS (FF). Comprehensive diagnostics and simulation functions, transmission of important device and process data over the bus cable.

### Temperature Measurement



#### Transmitters for rail-mounting

#### ■ SITRANS TR200 [1]

Universal transmitter programmable via PC (SIPROM T). Cost-saving operational functions and diagnostics LED.

#### ■ SITRANS TR300 [1]

HART universal transmitter configurable via SIMATIC PDM or HART protocol. Costsaving operational functions and diagnostics LED. Remote or local diagnostics and simulation.

#### ■ SITRANS TW [2]

Universal 4-wire transmitter for rail-mounting with HART communication, comprehensive diagnostics and simulation functions, configurable using SIMATIC PDM, optional limit value relay.

#### Transmitters for field-mounting

#### ■ SITRANS TF [3]

Transmitter for mounting in the field where excessive heat or vibrations are present at the measuring point; IP67 degree of protection, programmable, HART, PROFIBUS PA, FOUNDATION Fieldbus optional programmable digital display. Can also be used as remote display without transmitter for any 4 to 20 mA signal.

#### ■ SITRANS TF280 [4]

is a WirelessHART temperature transmitter that provides all measured process values as well as diagnostic information, parameters and functions via radio. The device is powered by an internal battery and designed for ultralow power consumption. Its compact and rugged design makes it specially suitable for direct mounting on tanks and pipes in remote parts of plants, and on moving or rotating equipment for process monitoring or asset management applications.





#### **SITRANS TS temperature sensors**

#### ■ SITRANS TS100 - cable sensors [5]

This cable temperature sensor product series comes with a direct mounted cable. As a basic or mineral-insulated version a wide field of application is supported. The installation is easy and flexible by using compression or soldering fittings. With the optional adapter surface measurement is simple to apply. The intrinsic safe version has the approval for operating even in zone 0 without an additional protection tube. In such application the excellent response time of the sensor will be an outstanding benefit.

#### ■ SITRANS TS200 - compact sensors [6]

The compact temperature sensor series adds to the excellent benefits of our SITRANS TS100. Instead of the flexible cable, it comes with a fixed connection M12. Lemo etc.

#### ■ SITRANS TS300 - for food and pharma [7]

Our food and pharma temperature sensor product series is featured with a wide range of appropriate process connections - the classical method. With the clamp-on temperature sensor Siemens strikes a new path. Comparable with built-in measurement regarding response time and accuracy the advantages especially at small pipe diameters are obviously. No welding and welding validation, no process disturbance, easy pigging, easy dismantling for recalibration.

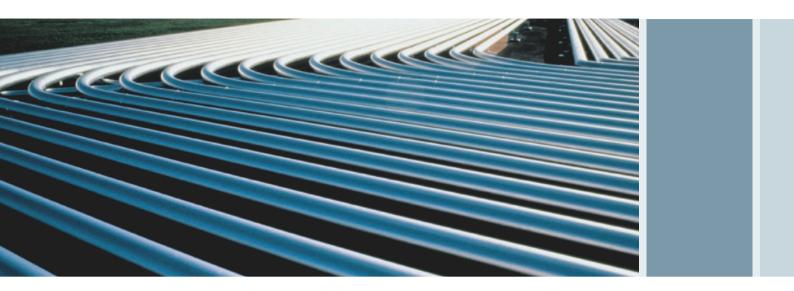
#### ■ SITRANS T temperature sensors – special for high temperatures and flue gas [8]

Our flue gas resistance thermometers and straight thermocouples for combustion plants and furnances.

#### ■ SITRANS TS500 - for pipes and vessels [9]

The industry temperature sensor series supports a wide field of measurements, from simple applications up to solutions for harsh environments. Designed as a modular system of tubular or barstock thermowell, extension, connection head and optional transmitter and display, the customers profit from the use of standard components for individual applications. Intrinsic safe versions are available as well as Ex d.

### Flow Measurement



Choosing the right flowmeter for the right application can dramatically improve your bottom line. In all industries, Siemens offers a compre-hensive selection of electromagnetic, Coriolis, ultrasonic, vortex, rotary piston and differential pressure flowmeters suitable for measuring a variety of liquids.



#### SITRANS FC430

The digitally based SITRANS FC430 features market-leading compactness, very high accuracy of 0.1%, low pressure loss, extremely stable zero point, best-in-class data update with 100 Hz high-speed signal transfer and the first SIL 3 certification on a Coriolis system. Unique support tools provide direct access to backup data, settings, certificates, and audit trails.







#### ■ SITRANS F M - Electromagnetic flowmeters

measure the volume flow of electrically conductive fluids like e.g. water, chemicals, food and beverage, slurries, sludge, paper stock, and mining slurries with magnetic particles.

The SITRANS F M product range is divided into three meter types:

#### ■ Modular pulsed DC meters

SITRANS F M DN 2 to DN 2000 (1/12" to 78")

- Full transmitter program MAG 5000/MAG 6000/ MAG 6000 I compact or remote mounting.
- Multiple I/O as standard and communication modules PROFIBUS PA/DP, FOUNDATION Fieldbus, HART and Modbus RTU.
- MAG 5100 W [1] sensor designed for water and wastewater applications.
- MAG 3100 P designed for process industry and the harsh requirements in the chemical industry.
- MAG 3100/MAG 3100 HT [2] sensor for general process industry.
- MAG 1100/1100 HT sensor for general process industries.
- MAG 1100 F [3] sensor for food and beverage and pharmaceutical industries.

#### ■ Battery-operated water meters

MAG 8000 DN 25 to DN 1200 (1" to 48") [4]

Designed for the water industry, the MAG 8000 program is a battery-powered solution that makes it easier than ever to install a reliable water meter virtually anywhere.

- Battery lifetime up to 6+ years.
- Mains powered 24 V AC/DC, 115 V AC/230 V AC with battery backup.
- IP68 (NEMA 6P) enclosure for sensor and transmitter in compact or remote version.
- MAG 8000 for abstraction and distribution network.
- MAG 8000 CT for revenue and bulk metering.
- MAG 8000 Irrigation for agriculture.

#### ■ High-powered AC meters

TRANSMAG 2 / 911/E DN 15 to DN 1000 (1/2" to 40") [5]

Specially designed for heavy mining slurries with or without magnetic particles as well as the most difficult applications in the pulp and paper industry.

- A wide choice of corrosion-resistant liner materials.
- Heavy duty industrial enclosure.
- No movable parts.

### Flow Measurement



#### ■ SITRANS F C Coriolis mass flowmeters

measure the direct mass flow rate of liquids and gases in almost any application.

It is a multivariable device delivering reliable information on mass flow, volume flow, temperature, density and concentration (e. g. Brix or Baume).

#### Flexibility and high performance with the MASS 6000 transmitter [4]

The flexible MASS 6000 transmitters are designed for high performance and easy operation ensuring a low cost of ownership.

### ■ Seamless integration with the SIFLOW FC070 module [2]

SIFLOW FC070 is a true multi-parameter Coriolis transmitter ready for quick installation and system integration into SIMATIC S7 and SIMATIC PCS 7 automation systems. SIFLOW FC070 is the most compact, space-saving and versatile module available.

#### ■ Innovation and user-friendliness transmitter SITRANS FCT030

The FCT030 transmitter is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy installation and maintenance. The FCT030 can be remote connected or compact mounted with all sensors of type FCS400.

Sensors meeting the toughest challenges.

Optimum measuring performance is achieved through an intelligent sensor design with a strong focus on safety, repeatability, and quality, enabling a high accuracy

0.1% of rate with a large turndown ratio. Sensor of capacity ranges from few g/h to 510 000 kg/h (few oz/h to 1 124 300 lb/h), covering applications ranging from mini-plants to bulk loading.

### ■ FCS400 sensors DN 15 - DN 80 in standard, hygienic (3A, EHEDG) and NAMUR versions [1] 0 to 136 000 kg/h (0 to 300 000 lb/h)

Fulfill the need for high performance at Chemical, Food & Beverage, Pharma and Hydrocarbon applications. Market -leading compactness saves space and money, with enough flexibility for installation anywhere and the ability to fit multiple units into tight spaces.

#### ■ MASS 2100 DI 1.5 [3] 0 to 65 kg/h (0 to 143 lb/h):

Ideal for low flow applications measuring liquid or gas.

#### ■ FC300 DN 4 0 to 350 kg/h (0 to 772 lb/h):

Low flow sensor with focus on compactness and machine integration.

#### ■ MASS 2100 DI 3 – DI 40 [4] 0 to 52 000 kg/h (0 to 114 600 lb/h):

Medium range sensors for general purpose applications.

#### FCS200 DN 10 - DN 25 [5] 0 to 30 000 kg/n (0 to 66 138 lb/h)

Ideal for measuring in CNG (Compressed Natural Gas) applications.

#### Standard MC2 DN 50 - DN 150 0 to 510 000 kg/h (0 to 1 124 300 lb/h):

Large sensors offering ideal fit between size and maximum flow capacity.









#### ■ SITRANS F US ultrasonic flowmeters

are available as in-line and clamp-on versions. Both meter types can be used with homogeneous conductive and non-conductive liquids and gases (only clamp-on). In addition to standard volume flow, they can also provide information on media quality and temperature. Meter calibration can be certified to industry standards.

#### ■ In-line ultrasonic flowmeters [6]

Ultrasonic in-line flowmeters are suitable for industrial applications with pipe sizes ranging from DN 50 to DN 1200 (2" to 48"). Full 2-track and 4-track sensors are available in combination with the SITRANS FUSO60 transmitter.

- Option between mild and stainless steel sensors.
- Transducers can be exchanged without interrupting operation.

#### ■ Retrofit flowmeter type, SONOKIT [7]

The SONOKIT system up to DN 4000 (160") is designed for in-line retrofitting on all existing pipelines as a 1-track or 2-track flowmeter. The unique design enables installation on empty pipes or pipes under pressure without process shut-down.

- Robust version can be buried and withstands constant flooding.
- Outstanding accuracy; the bigger the pipe, the more accurate the result.

#### ■ SITRANS FUS380 [8] and FUE380

For the utility industry the 2-track flowmeters, SITRANS FUS380 and FUE380, are designed to measure water flow in district heating plants, local networks, boiler stations, substations and other general water applications.

- Custody transfer approvals for district heating custody transfer applications.
- Battery or mains power enables installation where needed. Battery lifetime up to 6 years.
- Ideal for energy metering together with the SITRANS FUE950 [9] energy calculator.

### Flow Measurement



#### ■ Clamp-on ultrasonic flowmeters

The key feature of the clamp-on ultrasonic flow technology is the externally mounted sensors. They are quickly and easily installed on the outside of the pipe, making them the perfect choice for retro-fit applications and applications where corrosive, toxic or high pressure liquids and gases rule out the option of cutting the pipe. The technology provides highly accurate measurement of both liquids and gases on pipes ranging from DN 6 to DN 9140 (0.25" to 360") in size.

Clamp-on ultrasonic flowmeters are available in seven different families suitable for a wide range of industries and applications:

- SITRANS FUS1010 [1] for general industry
- SITRANS FUP1010 [2] portable meter
- SITRANS FUE1010 for HVAC
- SITRANS FUH1010 for hydrocarbon
- SITRANS FUG1010 for gas
- SITRANS FST020 [3] for basic water, wastewater and HVAC applications
- SITRANS FUT1010 [4] for hydrocarbon liquid and gas applications

Most families are available in single, dual or four channel configurations that offer great cost saving options. The dual channel version can be set up on two separate applications and can also provide arithmetic functions between the two channels. The 4-channel meter does not offer mathematical functions, but can monitor multi channels and paths.

The clamp-on ultrasonic flowmeters are also available as check metering kits for general liquid, water and wastewater, energy and gas applications. They all come in a sturdy rolling case, containing all the equipment necessary for performing flow measurement tasks. These kits are ideal for verifying existing applications regardless of measurement technology or application where no metering exists.

For the most basic flow applications, the SITRANS FST020 is the solution. It combines reliable measurement with simple configuration and set-up wrapped in a single channel design. It features an IP65 (NEMA 4X) enclosure, RS 232 communication and the WideBeam flow measurement technology (optional).

The SITRANS FUT1010 is available in a liquid and gas version. With performance meeting OIML R 117 and API recommendations, the ultrasonic flowmeter can be used for numerous upstream, midstream and downstream measurement tasks. A wide variety of sensor sizes ensures availability for virtually any application, including custody transfer applications where the permanent TransLoc system allows laboratory calibration.





#### ■ SITRANS F X - Vortex flowmeters

provide accurate standard volumetric and mass flow measurement of steam, gases, conductive and non-conductive liquids. The Vortex flowmeter functions as an "All-in-one-solution" with integrated temperature and pressure compensation together with an optional energy calculation.

It is specially designed for applications that require reliable flow measuring independent of pressure, temperature, viscosity and density. This makes it perfectly applicable in especially the chemical industry, HVAC & power, food & beverage, oil & gas and pharma.

The SITRANS F X Vortex flowmeters are available as flanged or sandwich versions in the following configurations:

#### ■ SITRANS FX300 [5]

- Volumetric flowmeter. Measurement of steam, gases, conductive and non-conductive liquids. Temperature compensation for saturated steam included in basic version as standard.
- Mass flowmeter. With pressure and temperature compensation for mass and standard volume flow measurement of gases or superheated steam. Integrated temperature and pressure sensors.
- Option with pressure sensor and isolation valve allows the pressure sensor to be shut off for the purpose of pressure or leak testing of the pipeline or for being exchanged without interrupting the process.

#### ■ SITRANS FX300 dual transmitter [6]

- Dual measurement for twofold reliability.
- Redundant system with two independent sensors and two converters.

#### ■ SITRANS LUT400 [7]

Reliable for open channel flow monitoring in water/ wastewater and plant effluent applications. Non-contact Echomax series ultrasonic transducers are used to complete the control system.

#### ■ SITRANS F R – rotary piston meters [8]

Used to measure the volume flow of conductive and non-conductive liquids. High viscosity media, acids and alco-holbased concentrates are accurately recorded. Even measurements subject to calibration standards can be undertaken. No inflow and outflow runs required.

#### ■ SITRANS F O – differential pressure flowmeters [9]

Universal flow measurement for liquids, gases and vapors. Always provide accurate results even with large bores, high temperature and extreme pressure.

### Level Measurement



Siemens level measurement instruments serve process industries worldwide, including water and wastewater, aggregate, cement, mining, dry-bulk storage, chemical, petrochemical, oil and gas, food and beverage, and pharmaceutical. A wide portfolio of technologies and products lets you choose the right solution for your application.



#### SITRANS LUT400

features industry-leading 1 mm (0.04") accuracy, setup in under a minute, and intuitive local user interface navigation. The controller is compatible with the full line of Siemens Echomax transducers, with an operating range of 0.3 to 60 meters (1 to 200 feet), depending on transducer.

Key applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage



#### POINT LEVEL DETECTION

#### ■ Vibration, rotary paddle and tilt

Siemens rotary or vibrating point level switches are a costeffective solution for solids and liquids applications. Their robust design lasts in harsh and abrasive environments. They detect high, low, and demand levels in solids, liquids and slurry applications, specializing in low bulk density applications. We offer a wide variety of configuration options suitable for any environment. SITRANS vibration and rotary paddle switches are simple to use with no complicated setup or configuration. Standard aluminum enclosures and a wide variety of process connections provide exceptional resistance to mechanical forces, long service life, and low cost of ownership.

- SITRANS LPS200 [1] rotary paddle switch detects solids with densities as low as 15 g/l (0.94 lb/ft³).
- SITRANS LVL100 and LVL200 [2] vibrating level switches for liquid and slurry applications, including high, low, and demand level alarms and pump protection.
- SITRANS LVS100 and LVS200 [3] vibratory switch detects solids with densities as low as 5 g/l (0.3 lb/ft³).

#### **■** Ultrasonic

Pointek ULS200 [4] is a non-contacting ultrasonic level switch with two switch points, effective in bulk solids, liquids, and slurries, and is ideal for sticky materials.

#### ■ Capacitance

Siemens Pointek inverse frequency shift capacitance point level switches provide accurate, reliable, and repeatable measurement in dusty, turbulent, and vaporous environments or applications with product buildup. Small changes in level create large changes in frequency. As a result Pointek devices have greater sensitivity and consistently outperform conventional devices. With their robust aluminum enclosures and process connections, Siemens Pointek switches are proven superior performers in liquids, solids, slurries and interfaces.

- Pointek CLS100 [5] compact 2- or 4- wire switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam.
- Pointek CLS200 and CLS300 [6] level switch for detecting liquids, solids, slurries, foam, and interfaces even in demanding conditions where high pressure and temperatures are present.
- Pointek CLS500 [7] level switch for critical conditions of more extreme temperatures and pressures.

### Level Measurement



#### CONTINUOUS LEVEL MEASUREMENT

#### Sonic Intelligence and Process Intelligence

Our patented Sonic Intelligence and Process Intelligence signal processing technologies were developed using knowledge provided by our field service engineers and data from devices installed in real applications. Siemens instruments offer the unique advantage of this technology. Both signal processing technologies differentiate between true echoes from the material and false echoes from obstructions or electrical noise. The sophisticated software is continually updated and supported by field data gained from more than a million applications. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is a repeatable, fast and reliable measurement you can trust.

#### ■ Radar

Even in harsh process conditions, Siemens radar transmitters are virtually unaffected. Non-contacting radar technology means low maintenance and provides reliable continuous level measurement for short to long-range applications.

Siemens offers a variety of radar instruments. Process Intelligence signal processing software ensures reliable and accurate level measurement and features Auto False-Echo Suppression, a technique that can automatically detect and suppress false echoes from vessel obstructions. This ensures high performance and is easy to implement, using just a few parameter entries on the infrared handheld interface or via configuration tools such as SIMATIC PDM, Pactware, or AMS.

- SITRANS Probe LR [1] 2-wire, 6 GHz pulse radar level transmitter for basic continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).
- SITRANS LR200 [2] 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids. Ideally suited for complex, turbulent process vessels including high temperatures and pressures to a range of 20 m (66 ft).
- SITRANS LR250 [3] 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage/process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.
- SITRANS LR260 [4] is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30m (98.4 ft).
- SITRANS LR460 [5] 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of solids in vessels to a range of 100 m (329 ft). Ideal for applications with extreme dust and high temperatures to 200 °C (392 °F) and very bulk density/low dielectric media.
- SITRANS LR560 [6] 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids. Very narrow 4 degree beam angle with 3" lens antenna. For ranges up to 100 m (328 ft).

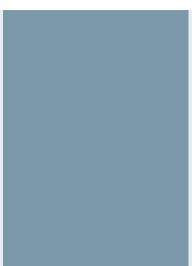


#### **■** Ultrasonic

Siemens is the world leader in ultrasonic level technology. SITRANS LUT400 is an easy to use and highly accurate level, volume and pump controller. For advanced solutions controllers are available with remotely mounted non-contacting ultrasonic transducers. Whether you select the transmitter or the controller you get a cost-effective non-contacting solution for a wide range of applications in virtually any industry.

- SITRANS Probe LU [7] 2-wire, loop powered ultrasonic transmitter for level/volume/flow monitoring of liquids in storage vessels, simple process vessels, and open channels.
- SITRANS LUT400 [8] Compact, single point ultrasonic controller for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.
- Rugged Echomax transducers [9] are built for harsh environments. They are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free.
- HydroRanger 200 [10] Level controller for up to 6 pumps including pump control, differential control, and open channel flow monitoring.

### Level Measurement





#### ■ Guided Wave Radar

uses Time Domain Reflectometry (TDR) to measure level by guiding an electromagnetic pulse down a probe (solid steel rod, steel cable or coaxial probe) toward the material. When the pulse reaches the material surface, the change in dielectric value between air and the material causes a portion of the pulse to reflect back toward the transmitter. Guided wave radar is unaffected by vapor, density, foam, dielectric fluctuations, temperature, and pressure changes, and works well for short and mediumrange measurements, and materials with low dielectric constants such as liquified gases. Interface of two liquids (i. e. oil/water) can also be measured with both level and interface reported over the HART output.

#### ■ SITRANS LG series [1]

- SITRANS LG240 For use in hygienic application environments.
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile for many applications.
- SITRANS LG260 Ideal for measuring level in medium range solids applications including grains, plastics and cement.
- SITRANS LG270 Offers configuration options for extreme conditions including high temperature and high pressure applications.







#### Capacitance

Our unique inverse frequency shift approach to capacitance technology ensures accurate, reliable, and repeatable measurement, even in dusty, turbulent, and vaporous environments, or in situations with product buildup. Because even a small level change creates a large change in frequency, our instruments provide better resolution and consistently outperform conventional devices. With special features such as Active-Shield technology, and modular probe options available on various models, they offer practical solutions to a wide variety of continuous level, and interface applications.

- SITRANS LC300 [2] is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for industrial applications in chemical, hydrocarbon processing, food and beverage, mining, aggregate and cement industries. Patented Active-Shield technology protects the measurement from the effects of moisture, vapors, foam, temperature or pressure variations, and material buildup.
- SITRANS LC500 [3] is an inverse frequency shift capacitance level or interface transmitter with active shield for critical applications, such as high-pressure coalescers, FPSO ships, LNG processing plants, cryogenic materials, and offshore oil and gas platforms. It performs in liquids, solids, interfaces, and foam and is unaffected by vapors, product deposits, dust, or condensation and is highly resistant to toxic and aggressive materials. SITRANS LC500 is the right solution if you're looking for high-precision level or interface measurement under extreme conditions.

#### ■ Hydrostatic

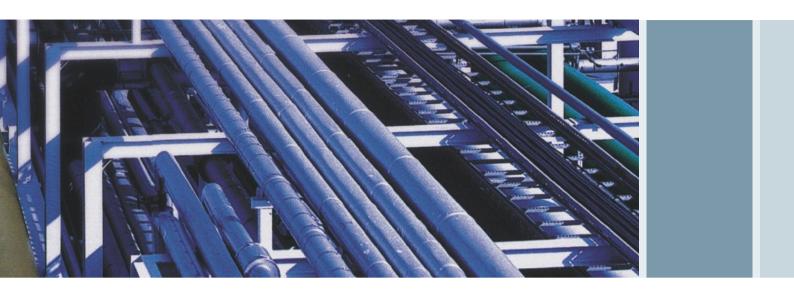
Low-cost level measurement for direct mounting or mounting with remote seals on tanks and vessels.

SITRANS LH100 [4] and SITRANS P DS III [5] can handle extreme chemical and mechanical loads as well as electromagnetic interference. They are widely applied in the chemical and petrochemical industries.

#### **■** Gravimetric

Gravimetric level measurement with SIWAREX [6] weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts and material characteristics.

### Positioners







#### SIPART PS2

State-of-the-art positioner with innovative features such as optional external non contacting position detection and many more.







#### ■ SIPART PS2 [1] [2] [3]

is currently the most widely used positioner for linear and part-turn actuators in a wide range of process industries. The proven all-round design has a particularly flexible stroke range, intelligent diagnostics, and different communication protocols.

- Versions with external non-contacting travel sensors.
- High flexibility in the stroke range from 3 to 200 mm (0.1 to 7.9 inch) (more on request).
- Communication via PROFIBUS PA, FOUNDATION Fieldbus or HART.
- Ex d explosion-proof version.
- SIPART PS2 is available in Makrolon, aluminum and stainless steel casings.
- SIPART PS2 prevents the closing of fittings during the solenoid valve test, or monitors open/close fittings as an "intelligent solenoid valve".
- Extreme low air consumption to minimize total cost of ownership.

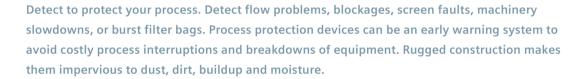
#### ■ Extended online diagnostics

Our intelligent SIPART PS2 is equipped with comprehensive functionalities, and deliver diagnostic data on themselves, their environment and the valve and actuator. With these premium diagnostics, these positioners set the standards for cost efficiency, reduce maintenance requirements in the plant, guarantee safe process control, and provide high functional safety in emergency situations. The following valve and actuator failures can be detected.

- Friction and clogging of a valve.
- Pneumatic leakage (e.g. tear in actuator membrane).
- Growing deposits in a pipeline or tear of valve plug for continuous processes.
- Wear and tear of valve seat or valve plug.
- Deposits or incrustations on valve seat or valve plug.
- Stiction of stuffing box.
- "Partial Stroke Test" (PST) for open/close valves (e.g. safety valves, ESD) and control valves.

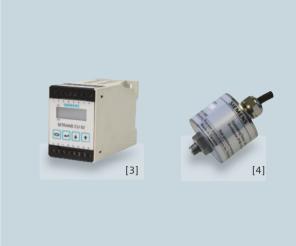
### **Process Protection**











#### **MOTION SENSORS**

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

#### ■ Milltronics MFA 4p with MSP or XPP probes [1]

This sensitive, single-setpoint motion sensor system can be used even in hazardous, high temperature, and harsh conditions because of its superior sensing probe design. The system protects equipment by detecting absence of motion, as well as underspeed or overspeed conditions.

#### ■ SITRANS WM100 [2]

This heavy-duty, zero-speed alarm switch detects absence or presence of motion of rotating, reciprocating or conveying equipment.

#### **ACOUSTIC SENSORS**

#### Acoustic sensors for material flow monitoring

The SITRANS AS100 [4] acoustic sensor detects high frequency acoustic emissions from friction or the impact of dust, powders, granules and other solids in motion. It signals flow/no flow or high/low flow. It features compact stainless steel construction for harsh environments and non-invasive mounting. The SITRANS AS100 can be connected to a SITRANS CU02 [3], which processes signals from the sensor, providing relay and analog outputs for connection into a process, or it can be connected directly to a PLC analog input.

### **Supplementary Components**



Supplementary Components are designed to work with most types of instrumentation to provide enhanced functionality such as seamless wireless communications, remote displays, and remote monitoring solutions. Customers can add Ethernet, web, logging and other functions to instruments.



## SITRANS RD500 [5] remote data manager provides remote monitoring solutions for instrumentation anytime, anywhere via the web.



#### REMOTE DIGITAL DISPLAYS

■ SITRANS RD100 [1] loop powered remote display, and RD200 [1] universal remote digital displays make measurement data visible and accessible from a remote location. They can be used with all types of field instruments in varying process conditions, and are easy to set up and program. SITRANS RD200 includes freely available logging and monitoring software, allowing multiple displays to be monitored from one PC.

#### **REMOTE DATA MANAGER**

■ SITRANS RD500 [5] is a remote data manager providing remote monitoring through datalogging, web access and alarming for instrumentation. It offers integrated web and ftp server, email and sms for alarming, and up to 2 gigabytes for data-logging of instrumentation with no programming required. It enables remote monitoring of inventory levels, process and environmental applications, and provides web access to most types of field instrumentation, including flow, level, pressure, temperature measurement and weighing. With SITRANS RD500 it is as simple as typing an IP-address in your web browser to access the data from remotely installed instrumentation. SITRANS RD500 collects and sends sensor data to logistics systems providing up to date, timely and accurate information used in decision making. Without the need for additional software you bring data from remote instrumentation via Ethernet or Modem (PSTN/GSM/GPRS) to your desktop, no matter where you are or where your instruments are.

#### WirelessHART Accessories

- The SITRANS AW210 [2] and the SITRANS AW200 [3] are WirelessHART adapter for normal or for hazardous areas which allows standard wired HART/4 ... 20 mA devices to be connected to a WirelessHART network. By installing the SITRANS AW200 on an existing analog-wired HART device, users can utilize all diagnostic information at the maintenance station without any risk of impairing operation. It is possible to connect also several devices to one adapter. Due to its battery the SITRANS AW200 is able to supply also the connected field device with electrical power.
- The IE/WSN-PA LINK [4] is a WirelessHART gateway for connecting a WirelessHART network to a plant host application. With the integrated network manager it is easy to configure WirelessHART networks and optimize network performance and security settings.

The link also supports redundancy in both ways, to the WirelessHART network and to plant host applications. Funktion block libraries allow easy integration of WirelessHART into the process control system SIMATIC PCS 7 and into PLC families S7-300 and S7-400.

### Communication and Software

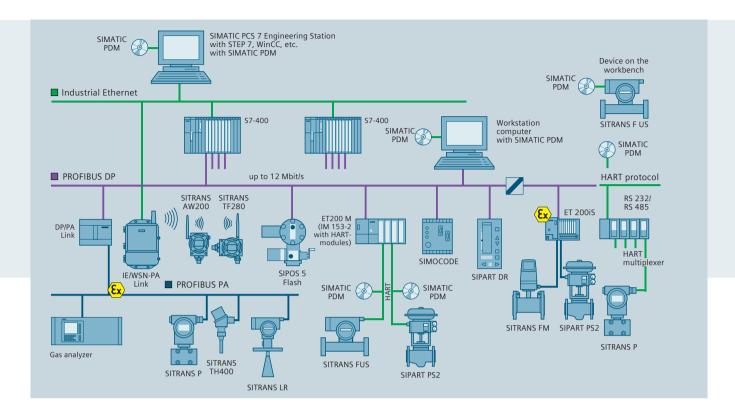


Reliable communication between process devices and control systems is essential for efficient and safe processes. With different communication protocols and the necessary software Siemens offers the right tools to integrate their process instruments and analyzers into the world of process automation. The platform of Totally Integrated Automation from Siemens ensures a high level of transparency at all plant levels – from the field up to the production control level and the corporate management level.



#### SITRANS MDS

(Maintenance and Diagnostic Station) is a Windows-based application for retrieving and managing maintenance information from field devices.



#### **■ SIMATIC PDM**

SIMATIC PDM (Process Device Manager) is a universal, non-proprietary tool for the configuration, parameterization, commissioning, diagnostics and maintenance of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control room devices, compact controllers).

Over 1,200 process devices from more than 100 manufacturers are supported by SIMATIC PDM. The design and function of the devices can be described using the Electronic Device Description Language (EDDL), based on the leading EDD international standard (Electronic Device Description; IEC 61804).

SIMATIC PDM uses this to automatically create an easy-touse interface providing the required information on the process devices. The latest release of this standard allows the implementation of state-of-the-art user interfaces:

- Intuitive Quick Start Wizards
- Enhanced graphical interface

Communication with process devices is by HART, PROFIBUS or alternative protocols. SIMATIC PDM can be used as a universal parameterization tool as well as in the integrated version in the SIMATIC Step7/PCS 7 environment.

SIMATIC PDM meets all requirements from field level to various types of industrial communication and central engineering service and maintenance.

#### Asset Management

comprises all activities and measures designed to maintain or increase the value of a plant. This primarily includes value-enhancing service and maintenance (plant-specific asset management) in addition to business management, process management and process optimization. Because of its comprehensive functionality SIMATIC PDM is particularly suited to provide the device data required for plant-specific asset management and transfer it to higher-level asset management systems in XML format via a uniform interface. However, SIMATIC PDM is much more than just a data logger for higher-level asset management systems. It offers a wide range of asset management functions as well.

### Communication and Software











#### PROFIBUS

Decentralized automation solutions based on open field buses are currently standard in many areas of the production and process industry. The benefits of digital communication can be fully exploited in combination with field buses, including improved resolution of measurement

values, diagnostics options and remote parameterization.

PROFIBUS is currently the most successful open field bus, providing a flexible platform for a variety of applications. Based on the IEC 61158 standard, it is a reliable investment and suitable for fast communication in production and process automation. It is the first field bus and meets the requirements of both sectors with the same communication performance.

PROFIBUS PA is tailored to the requirements of the process industry, handling both the power supply for the devices and communication between the devices and higher-level systems.

PROFIBUS PA is intrinsically safe and can be used in hazardous areas.

#### FOUNDATION Fieldbus

Field devices for measuring pressure, temperature, flow, level and actuators are also available for the intrinsically safe FF bus. Communication via FF is also based on the EDD standard and thus also offers the benefits of digital communication.





#### ■ HART – field communication protocol

The HART communication standard is used by more than 30 million installed smart process instruments with increasing numbers. The standard is managed by the HCF (HART Communication Foundation) and extends analog 4–20 mA signals to modulated, industry-quality, digital HART signals. The advantage is the combination of tried-and-tested analog measurement-value transfer and simultaneous digital communication with bi-directional, acyclic transfer. This allows transfer of diagnostics, maintenance and process information from field devices to higher-level systems. Standardized parameter sets can be used for the non-proprietary operation of all HART devices.

Enhanced electronic device descriptions (EDD) are used to integrate HART devices into the SIMATIC PDM.

This ensures simple operation and commissioning of field devices, even in inaccessible locations.

#### ■ WirelessHART

is an intelligent advancement of the proven wired 4 –20 mA HART technology towards wireless communication as part of HCF Specification V7. WirelessHART is backward compatible with wired HART technology, and as such offers maximum protection for investments in hardware and software, tools and expertise. WirelessHART is designed to communicate measured process variables or setpoints via the network but also diagnostic and maintenance information and para-meters. WirelessHART uses state-of-the-art security technologies to ensure network and data protection. Theses are e.g. meshed network topology including redundancy, data encryption, message integrity, etc.

#### SITRANS DTM

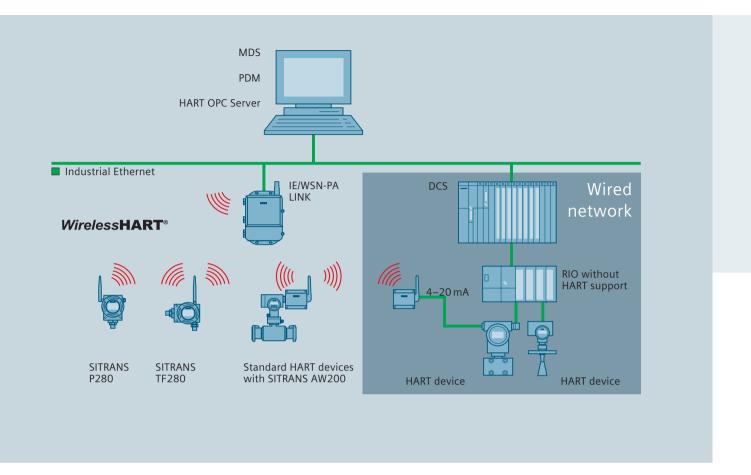
Enhanced electronic device descriptions (EDD) are used to integrate field devices in SIMATIC PDM or other tools like AMS.

Some tools in the market like PACTware or Fieldcare are based on a technique called FDT (Field Device Tool). SITRANS DTM integrates EDDs from our devices in these FDT-based tools.

#### **■** Emerson AMS

Many of Siemens HART and FF devices also have EDDs designed for AMS by Emerson.

# Communication and Software

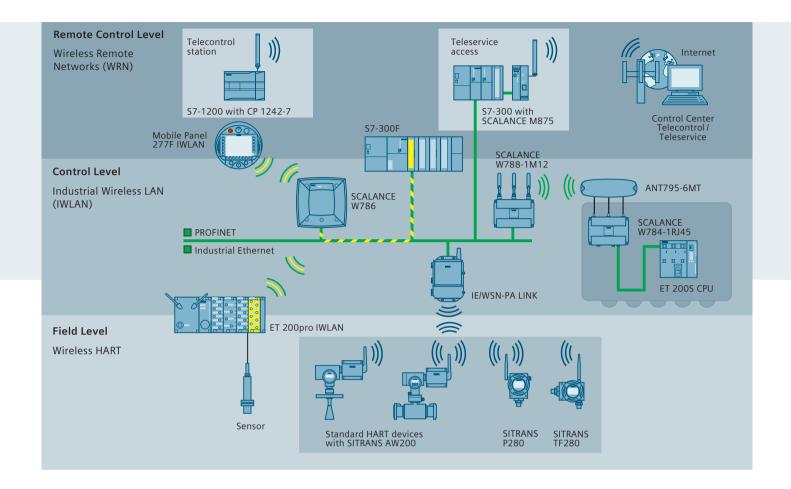


#### **SITRANS MDS**

(Maintenance and Diagnostic Station) is a Windows-based application for retrieving and managing maintenance and diagnostic information from field devices.

#### Features:

- Use of SIMATIC PDM to retrieve maintenance and diagnostic.
- All devices reachable by SIMATIC PDM are supported.
- Device list is shown in tree form, with properties and maintenance information in a column on the right-hand side.
- Selectable update interval for all devices.
- Visualization of the maintenance status with SIMATIC-specific icons or NAMUR (NE 107) icons.
- Archiving of recent events for each device.
- User-editable report.



# Wireless HART®

#### Success factor Industrial Wireless Communication

Industrial Wireless LAN (IWLAN) and GSM/GPRS-based wireless wide area networks play a successful and important part at control and remote control level.

WirelessHART answers your challenge and opens up new communication options.

- Flexible for installation, replacement or upgrading; ideal for temporary measurements and on moving or rotating equipment.
- Cost-efficient for remote and difficult to access facilities: significant cost savings for cabling, commissioning and engineering. Reduced operating costs thanks to increased plant efficiency and lower maintenance expenditure.
- Maintenance-friendly thanks to access to valuable diagnostic information.
- High plant availability and production quality due to cost-effective measurement points and higher transparency throughout the plant.

The optimum use of wired and wireless devices in one system creates the best basis for a new standard of performance in automation.

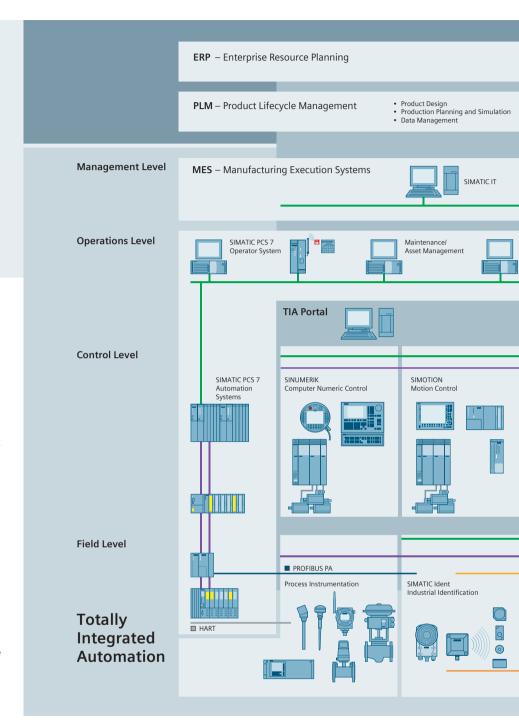
# Communication and Software

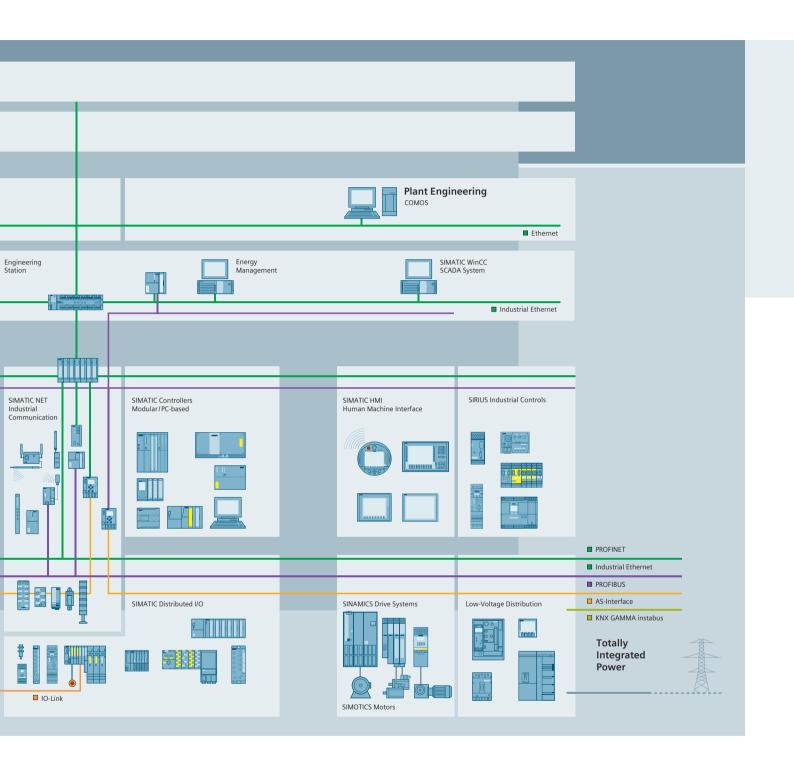
### ■ Totally Integrated Automation – TIA

is characterized by its unique degree of integration which ensures a high level of transparency at all plant levels – from the field level to the production control level and the corporate management level. This concept provides considerable benefits throughout the entire plant life cycle, from the initial planning and engineering stages, commissioning, operations and maintenance right through to modernization. The process instruments designed by Siemens have been perfectly integrated into the TIA concept.

The SIMATIC PDM (Process Device Manager) is used as a central parameterization tool to allow the user continuous access to all the field devices of his plant.

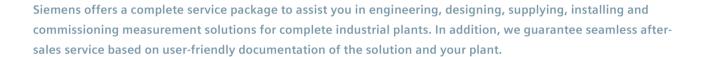
Thanks to modern fieldbus communication like HART, PROFIBUS or FOUNDATION Fieldbus the field devices can be integrated into the overall plant. By integrating the devices into the PCS7 Asset Management system the user receives diagnostics information from the field devices whenever he needs it, allowing him to optimize the servicing and maintenance of his plant and avoid downtime.





# **Complete Solutions**





Real-world measurement technology from Siemens is a multifaceted offering. For example, we provide all field instruments from a single source, as requested by many customers. Our "one-stop shopping" approach includes both sensors and actuators. Siemens supports integrated engineering of your complete process instrumentation all the way to integration with your process control system. Additional industrial components and systems integrate seamlessly into the overall plant and ensure smooth process flows.

#### Overview of our services portfolio:

- Plant engineering and scheduling by an experienced project management team.
- Specialists assist you in the selection and use of the field instruments.
- SIPLAN C/E is state-of-the-art software available for effective plant engineering and order processing. This program is also very useful for providing actual customer documentation.

- Plant documentation comprises:
- Basic documentation, including device specifications, product and use lists.
- Higher-level documentation, including plant, process, identification and grounding concepts.
- Mechanical documentation, including setup and installation diagrams, hookups, cable routings.
- Electrical documentation, including circuit and wiring diagrams, cable lists.
- Specification and delivery of all required process instruments.
- Intensive preparation for installation.
- Reliable supply of installation material.
- Installation and/or installation supervision.
- Commissioning and/or commissioning supervision.
- Comprehensive after-sales service.

Regardless of the solution we offer you, the focus is always on customer value.



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1/36	<b>Transmitters with WirelessHART</b> SITRANS P280 for gauge and abs. pressure	.,_
1/41 1/63 1/64	Transmitters for food, pharmaceuticals and biotechnology SITRANS P300 for gauge and abs. pressure SITRANS P300 Spare parts/Accessories SITRANS P300 - Factory-mounting of valve manifolds on transmitters	1/2 1/2 1/2
1/66 1/71 1/77	Transmitters for the paper industry SITRANS P300 and DS III for gauge pressure with PMC connection Technical description Technical specifications, ordering data, dimensional drawings - SITRANS P DS III with PMC connection - SITRANS P300 with PMC connection	1/2 1/2 1/3 1/3 1/3 1/3 1/3 1/3
1/84 1/88 1/94 1/103	Transmitters for applications with basic requirements (Basic)  SITRANS P310  Technical description  Technical specifications, ordering data, dimensional drawings  - for gauge pressure  - for differential pressure and flow SITRANS P310 Accessories/Spare parts	1/3 1/3 1/3 1/3 1/3 1/3
1,100	Transmitters for applications with advanced requirements (Advanced)	1/3
1/105	SITRANS P DS III Technical description Technical specifications, ordering data, dimensional drawings - for gauge pressure	1/3 1/3 1/3
1/122	<ul> <li>for gauge and absolute pressure with front-flush diaphragm</li> <li>for absolute pressure (from gauge</li> </ul>	1/3
1/145 1/155 1/171 1/185	pressure series) - for absolute pressure (from differential pressure series) - for differential pressure and flow - for level SITRANS P DS III Supplementary	1/3 1/3 1/3 1/3 1/3 1/3
1/187 1/193 1/197	electronics for 4-wire connection SITRANS P DS III Accessories/Spare parts SITRANS P DS III - Factory-mounting of valve manifolds on transmitters SITRANS P410 Technical description	1/3 1/3 1/3
1/203 1/215 1/234	Technical description Technical specifications, ordering data, dimensional drawings - for gauge pressure - for differential pressure and flow SITRANS P410 Accessories/Spare parts	

#### Transmitters for applications with highest requirements (Premium) SITRANS P500 Technical description Technical specifications, ordering data, dimensional drawings - for differential pressure and flow - for level SITRANS P500 - Supplementary electronics for 4-wire connection SITRANS P500 Accessories/Spare parts SITRANS P500 - Factory-mounting of valve manifolds on transmitters Remote seals for transmitters and pressure gauges 67 Technical description Diaphragm seals of sandwich design 80 - with flexible capillary Diaphragm seals of flange design - with flexible capillary - directly fitted on transmitter

- fixed connection and with capillary
Diaphragm seal, screwed design
- directly mounted or/and with capillary
Quick-release diaphragm seals
Miniature diaphragm seals
Flushing rings for diaphragm seals
Inline seals for flange-mounting
Quick-release inline seals

#### **Fittings**

Questionnaire

Measuring setups
- with remote seals
- without remote seals

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	Shut-off valves for gauge and absolute
	pressure transmitters
1/338	- Shut-off valves to DIN 16270,
	DIN 16271 and DIN 16272
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40 - Angle adapter

- Double shut-off valves

- Accessories for shut-off valves/double shut-off valves

Shut-off valves for differential pressure transmitters

4 - 2-, 3- and 5-spindle valve manifolds DN 5

- Multiway cocks PN 100 349 - 3-way and 5-way valve

- 3-way and 5-way valve manifolds DN 5

352 - 3-way valve manifold DN 8

5 - Valve manifold combination DN 5/DN 8

57 - Valve manifold combination DN 8

- 2-, 3- and 5-spindle valve manifolds

for installing in protective boxes

 3- and 5-spindle valve manifolds for vertical angular diff. pressure lines

- Low-pressure multiway cockAccessories

You can download all instructions, catalogs and certificates for SITRANS P free of charge at the following Internet address: www.siemens.com/sitransp

Product overview

## Overview

Overview	Application	Description		Software for parameterization
SITRANS P Single-range trans	mitters for general applicat	tions		
	Two or three-wire transmitters for measuring gauge and absolute pressure	SITRANS P200  Single-range transmitters for gauge and absolute pressure  Ceramic measuring cell  For general applications	1/5	-
		SITRANS P210 Single-range transmitters for gauge pressure Stainless steal measuring cell For low-pressure applications	1/11	-
		SITRANS P220  Single-range transmitters for gauge pressure Stainless steel measuring cell, fully welded For high-pressure applications and refrigeration technology	1/16	-
	Two-wire transmitter for measuring hydrostatic levels	SITRANS LH100  For measuring liquid levels in wells, tanks, channels, dams etc.  With ceramic diaphragm, Ø 23.4 mm	1/22	-
	Transmitters for gauge and absolute pressure for food, pharmaceuticals and biotechnology  CERTIFIED  CHEDG  TREEL  BETTERENDE BOTE	SITRANS P Compact  Single-range transmitters in two-wire system  Hygiene-based design with various aseptic connections according to EHEDG, FDA and GMP recommendations.	1/27	-
SITRANS P · Transmitters with V	WirelessHART communication			
	Wireless transmitter with Wireless HART for measuring gauge and absolute pressure	SITRANS P280  • Wireless communication with WirelessHART  • Battery operation  • Parameterization using 3 buttons and SIMATIC PDM with HART modem or wireless with WirelessHART	1/36	SIMATIC PDM
SITRANS P · Transmitters for foo	od, pharmaceuticals and biotec	chnology		
	Two-wire transmitters for measuring gauge and absolute pressure  CERTIFIED  CHEDG  TYPE EL  SEPTIMENER 2001	SITRANS P300  • Hygiene-based design according to EHEDG, 3A, FDA and GMP  • Parameterization using 3 buttons and communication over HART, PROFIBUS PA or FOUNDATION Fieldbus  • Standard process connection G½", ½-NPT and front-flush process connections available  • Range adjustment 100 : 1	1/41	SIMATIC PDM
		Factory-mounting of valve manifolds on SITRANS P300 transmitters  • Simplified assembly  • With pressure test  • Stainless steel valve manifolds	1/64	-

Product overview

	Application	Description		Software for parameterization
SITRANS P · Transmitters for ga	nuge pressure for the paper ind	ustry		
	Two-wire transmitters for measuring gauge pressure	SITRANS P300 and SITRANS P DS III with PMC connection for the paper industry  • Range adjustment 100 : 1  • Process connections for the paper industry  • Parameterization using 3 buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus	1/66	SIMATIC PDM
SITRANS P Transmitters for a	pplications with basic requ	irements (Basic)		
	Two-wire transmitter for measuring: • Gauge pressure, • Differential pressure and • Flow	Measuring accuracy up to 0.075 %     Range adjustment: 100 : 1     Parameterization using 3 buttons and HART	1/84	SIMATIC PDM
SITRANS P Transmitters for a	pplications with advanced	requirements (Advanced)		
	Two-wire transmitters for measuring:  • Gauge pressure,  • Absolute pressure,  • Differential pressure and  • Flow or  • Level	SITRANS P DS III  Measuring accuracy up to 0.065 %  Range adjustment: 100 : 1  Parameterization using:  3 buttons and HART for SITRANS P DS III HART  3 buttons and PROFIBUS PA for SITRANS P DS III PA series  3 buttons and FOUNDATION Fieldbus for SITRANS P DS III FF series  Available ex stock	1/105	SIMATIC PDM
	Supplementary electronics for adaptation of two-wire transmitters for four-wire connections	Output: 0/4 20 mA Power supply: 24 V AC/DC, 230 V AC	1/185	-
		Factory mounting of valve manifolds on gauge, absolute or differential pressure transmitters SITRANS P DS III  • Simplified assembly • With pressure test • Stainless steel valve manifolds	1/193	-
	Two-wire transmitters for measuring:  • Gauge pressure,  • Differential pressure and • Flow	SITRANS P410 NEW  Measuring accuracy up to 0.04 %  Range adjustment 100 : 1  Parameterization using:  3 buttons and HART for SITRANS P410 HART  3 buttons and PROFIBUS PA for SITRANS P410 PA  3 buttons and FOUNDATION Fieldbus for SITRANS P410 FF	1/197	SIMATIC PDM
		Factory mounting of valve manifolds on gauge, absolute or differential pressure transmitters SITRANS P410 • Factory valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/193).		

Product overview

	Application	Description		Software for parameterization
<b>SITRANS P - Transmitters for</b>	applications with highest re	equirements (Premium)		
	Two-wire transmitters for measuring:  • Differential pressure  • Volume flow  • Mass flow  • Level  • Volume  • Mass	SITRANS P500  Measuring accuracy up to 0.03 % Range adjustment: 200 :1 High measuring accuracy Very fast response time Extremely good long-term stability Parameterization using 3 buttons or HART	1/237	SIMATIC PDM
	Supplementary electronics for adaptation of two-wire transmitters for four-wire connections	Output: 0/4 20 mA Power supply: 24 V AC/DC, 230 V AC	1/259	-
		Factory-mounting of manifolds on differential pressure transmitters SITRANS P500  • Simplified assembly  • With pressure test  • Stainless steel valve manifolds	1/264	-
Remote seals for transmitters as	nd pressure gauges			
	Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures)	Remote seals in sandwich and flange designs Quick-release remote seals for the food industry Wide range of diaphragm materials and fill fluid available	1/267	-
Fittings				
	Shutting off the lines for the medium and differential pressure  Mounting of transmitter on valve manifold or shut-off fitting	Shut-off fittings and valve manifolds available in steel, brass or stainless steel Valve manifolds available for the various process connections of the SITRANS P transmitters	1/335	-
		As accessory for fittings are available:  Oval flange  Mounting collars  Connection glands  Connection parts G½  Water traps  Sealing rings to EN 837-1  Pressure surge reducers  Primary shut-off valves  Compensation vessels  Connection parts	1/368 1/369 1/370 1/371 1/372 1/372 1/373 1/374 1/376 1/377	

Single-range transmitters for general applications

#### SITRANS P200 for gauge and absolute pressure

#### Overview



The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- Ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

#### Benefits

- · High measuring accuracy
- Rugged stainless steel enclosure
- · High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

#### Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- · Mechanical engineering
- Shipbuilding
- Power engineering
- · Chemical industry
- Water supply

### Design

#### Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

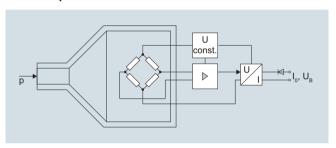
#### Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

### Function

The pressure transmitter measures the gauge and absolute pressure of liquids and gases as well as the level of liquids.

#### Mode of operation



SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Single-range transmitters for general applications

## SITRANS P200 for gauge and absolute pressure

Technical specifications			
Application		Design	
Gauge and absolute pressure	Liquids, gases and vapors	Weight	Approx. 0.090 kg (0.198 lb)
measurement		Process connections	See dimension drawings
Mode of operation	D:	Electrical connections	• Connector per
Measuring principle	Piezo-resistive measuring cell (ceramic diaphragm)		EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT or Pg 11
Measured variable	Gauge and absolute pressure		• M12 connector
Inputs			• 2 or 3-wire (0.5 mm <sup>2</sup> ) cable
Measuring range			<ul><li>(∅ ± 5.4 mm)</li><li>Quickon cable quick screw con-</li></ul>
<ul> <li>Gauge pressure</li> <li>Metric</li> </ul>	1 60 bar (15 870 psi)		nection
- US measuring range	15 1000 psi	Wetted parts materials	
Absolute pressure     Metric	0.6 16 bar a (10 232 psia)	Measuring cell	Al <sub>2</sub> O <sub>3</sub> - 96 %
- US measuring range	10 300 psia	Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
Output Current signal	4 20 mA	Gasket	• FPM (Standard)
Current signal	4 20 mA		• Neoprene
• Load	(U <sub>B</sub> - 10 V)/0.02 A		<ul><li>Perbunan</li></ul>
Auxiliary power U <sub>B</sub> Valtage a signal.	DC 7 33 V (10 30 V for Ex)		• EPDM
Voltage signal	0 10 V DC	Non-wetted parts materials	
• Load	≥ 10 kΩ	• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
Auxiliary power U <sub>B</sub> Dever consumption	12 33 V DC < 7 mA at 10 kΩ	• Rack	Plastic
Power consumption     Characteristic curve		Cables	PVC
Measuring accuracy	Linear rising	Certificates and approvals	1.0
	• Typical: 0.25 % of full apple	Classification according to pressure	For gases of fluid group 1 and liq-
Error in measurement at limit setting incl. hysteresis and reproducibility	<ul> <li>Typical: 0.25 % of full-scale value</li> <li>Maximum: 0.5 % of full-scale value</li> </ul>	equipment directive (PED 97/23/EC)	uids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Step response time T <sub>99</sub>	< 5 ms	Lloyd's Register of Shipping (LR)	12/20010
Long-term stability		Germanischer Lloyd (GL)	GL19740 11 HH00
<ul> <li>Lower range value and measuring span</li> </ul>	0.25 % of full-scale value/year	American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Influence of ambient temperature		Bureau Veritas (BV)	BV 271007A0 BV
Lower range value and measuring	0.25 %/10 K of full-scale value	Det Norske Veritas (DNV)	A 12553
span	0.20 /0/10 N of fair Scale value	Drinking water approval (ACS)	ACS 11 ACC NY 055
Influence of power supply	0.005 %/V	EAC	№ TC RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ»
Conditions of use		Underwriters Laboratories (UL)	ос напио «цсвэ»
Process temperature with gasket made of:		• for USA and Canada	UL 20110217 - E34453
<ul> <li>FPM (Standard)</li> </ul>	-15 +125 °C (+5 +257 °F)	• worldwide	IEC UL DK 21845
<ul> <li>Neoprene</li> </ul>	-35 +100 °C (-31 +212 °F)	Explosion protection	
• Perbunan	-20 +100 °C (-4 +212 °F)	Intrinsic safety "i" (only with current	Ex II 1/2 G Ex ia IIC T4 Ga/Gb
• EPDM	-40 +145 °C (-40 +293 °F), usable for drinking water	output)	Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
Ambient temperature	-25 +85 °C (-13 +185 °F)	EC type-examination certificate	SEV 10 ATEX 0146
Storage temperature	-50 +100 °C (-58 +212 °F)	Connection to certified intrinsically- safe resistive circuits with maxi-	$U_i \le 30 \text{ V DC}; I_i \le 100 \text{ mA};$ $P_i \le 0.75 \text{ W}$
Degree of protection (to EN 60529)	<ul> <li>IP 65 with connector per EN 175301-803-A</li> </ul>	mum values:	'
	• IP 67 with M12 connector	Effective internal inductance and capacity for versions with plugs per	$L_i = 0 \text{ nH}; C_i = 0 \text{ nF}$
	IP 67 with cable	EN 175301-803-A and M12	
	IP 67 with cable quick screw connection		
Electromagnetic compatibility	• acc. IEC 61326-1/-2/-3		

 acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %

Single-range transmitters for general applications

## SITRANS P200 for gauge and absolute pressure

	d ordering data								Article No.		Order	cou
	200 pressure tran			e and abso	olute pressur	e for general	applications	•	7MF1565-			
	materials: Ceram	, ,		+ sealing n	naterial							
·	arts materials: sta			. Joanny II	atorial							
'	e Article No. for t			n in the DIA	Life Cycle Pa	ortal						
		1		TITUIE PIA	Life Cycle PC							
Measuring ra	ange	Overloa	ad iimit	1		Burst press	sure					
		Min.		Max.								
For gauge pr	ressure											
0 1 bar	(0 14.5 psi)	-1 bar	(-14.5 psi)	2.5 bar	(36.26 psi)	> 2.5 bar	(> 36.3 psi)	▶₩		3 B A		
0 1.6 bar	(0 23.2 psi)	-1 bar	(-14.5 psi)	4 bar	(58.02 psi)	> 4 bar	(> 58.0 psi)			3 B B		
0 2.5 bar	(0 36.3 psi)	-1 bar	(-14.5 psi)	6.25 bar	(90.65 psi)	> 6.25 bar	(> 90.7 psi)			3 B D		
0 4 bar	(0 58.0 psi)	-1 bar	(-14.5 psi)	10 bar	(145 psi)	> 10 bar	(> 145 psi)			3 B E		
0 6 bar	(0 87.0 psi)	-1 bar	(-14.5 psi)	15 bar	(217 psi)	> 15 bar	(> 217 psi)			3 B G		
0 10 bar	(0 145 psi)	-1 bar	(-14.5 psi)	25 bar	(362 psi)	> 25 bar	(> 362 psi)			3 C A		
0 16 bar	(0 232 psi)	-1 bar	(-14.5 psi)	40 bar	(580 psi)	> 40 bar	(> 580 psi)			3 CB		
0 25 bar	(0 363 psi)	-1 bar	(-14.5 psi)	62.5 bar	(906 psi)	> 62.5 bar	(> 906 psi)			3 C D		
0 40 bar 0 60 bar	(0 580 psi) (0 870 psi)	-1 bar -1 bar	(-14.5 psi) (-14.5 psi)	100 bar 150 bar	(1450 psi) (2175 psi)	> 100 bar > 150 bar	(> 1450 psi) (> 2175 psi)	<b>&gt;</b> •		3 C E 3 C G		
		I			, , ,		(> 2175 psi)					
	, add Order code	and plair	n text: Measu	iring range	: up to ba	ar (psi)				9 A A		H 1
For absolute	•		(0 ! )		(10.51		/ 00 0 · · ·					
0 0.6 bar a	(0 8.7 psia)	0 bar a	(0 psia)	3 bar a	(43.51 psia)		(> 36.3 psia)			5 A G		
0 1 bar a 0 1.6 bar a	(0 14.5 psia)	0 bar a 0 bar a	(0 psia)		(36.26 psia) (58.02 psia)	> 2.5 bar a > 4 bar a	(> 36.3 psia) (> 58.0 psia)			5 B A 5 B B		
0 1.6 bar a	(0 23.2 psia) (0 36.3 psia)	0 bar a	(0 psia) (0 psia)		(56.02 psia) a (90.65 psia)		(> 58.0 psia) (> 90.7 psia)			5 B D		
							,					
0 4 bar a 0 6 bar a	(0 58.0 psia)	0 bar a	(0 psia)		(145 psia)		(> 145 psia)			5 B E		
0 6 bar a 0 10 bar a	(0 87.0 psia) (0 145 psi)	0 bar a 0 bar a	(0 psia)		(217 psia) (362 psia)	> 15 bar a > 25 bar a	(> 217 psia)	<b>&gt;</b> •		5 B G 5 C A		
0 10 bar a 0 16 bar a	(0 145 psi) (0 232 psi)	0 bar a	(0 psia) (0 psia)		(580 psia)	> 25 bar a	(> 362 psia) (> 580 psia)			5 C B		
			` ' '				(> 000 psia)					
	, add Order code				:: up to rr	ibar a (psia)				9 A A		H 2
Measuring ra	anges for gauge	pressure	` •	5 market)	(05!)		( OF!)			400		
	(0 15 psi)		(-14.5 psi)		(35 psi)		(> 35 psi) (> 35 psi)			4 B B 4 B C		
	(3 15 psi) (0 20 psi)		(-14.5 psi) (-14.5 psi)		(35 psi) (50 psi)		(> 50 psi)			4 B D		
	(0 20 psi)		(-14.5 psi) (-14.5 psi)		(80 psi)		(> 80 psi)			4 B E		
	(0 60 psi) (0 100 psi)		(-14.5 psi)		(140 psi) (200 psi)		(> 140 psi) (> 200 psi)			4 B F 4 B G		
	(0 150 psi)		(-14.5 psi) (-14.5 psi)		(350 psi)		(> 200 psi) (> 350 psi)			4 C A		
	(0 200 psi)		(-14.5 psi)		(550 psi)		(> 550 psi)			4 C B		
	(0 300 psi)				(800 psi)		(> 800 psi)			4 C D		
	(0 300 psi)		(-14.5 psi) (-14.5 psi)		(800 psi) (1400 psi)		(> 800 psi) (> 1400 psi)			4 C E		
	(0 750 psi)		(-14.5 psi) (-14.5 psi)		(2000 psi)		(> 2000 psi)			4 C F		
	(0 1000 psi)		(-14.5 psi)		(2000 psi)		(> 2000 psi)			4 C G		
Other version	, add Order code	I and plair		ıring range		ı si	. , ,			9 A A		H 1
	anges for absolu					<u>.</u>				,,,,		
measuring to	(0 10 psia)	 	(0 psia)		(35 psia)		(> 35 psia)			6 A G		
	(0 15 psia)		(0 psia)		(35 psia)		(> 35 psia)			6 B A		
	(0 20 psia)		(0 psia)		(50 psia)		(> 50 psia)			6 B B		
	(0 30 psia)		(0 psia)		(80 psia)		(> 80 psia)			6 B D		
	(0 60 psia)		(0 psia)		(140 psia)		(> 140 psia)			6BE		
	(0 100 psia)		(0 psia)		(200 psia)		(> 200 psia)			6 B G		
	(0 150 psia)		(0 psia) (0 psia)		(350 psia)		(> 350 psia)			6 C A		
	(0 200 psia)		(0 psia)		(550 psia)		(> 550 psia)			6 C B		
	(0 300 psia)		(0 psia)		(800 psia)		(> 800 psia)			6 C C		
	,/	1										

Available ex stock

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Single-range transmitters for general applications

## SITRANS P200 for gauge and absolute pressure

Selection and ordering data		Article No.		Orde	r cod	
SITRANS P 200 pressure transmitters for pressure and absolute pressure for general application	ons	7MF1565-				
Accuracy typ. 0.25 % Wetted parts materials: Ceramic and stainless steel + sealing material						
Non-wetted parts materials: stainless steel						
Output signal						H
4 20 mA; two-wire system; power supply 7 33 V DC (10 30 V DC for ATEX versions) 0 10 V; three-wire system; power supply 12 33 V DC	<b>&gt;</b>		0 1 0			
Explosion protection (only 4 20 mA)						
None With explosion protection Ex ia IIC T4	<b>&gt;</b> •		0 1			
Electrical connection		-				
Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling) Round connector M12 per IEC 61076-2-101 Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i") Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i") Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling) Fixed mounted cable, length 5 m Special version	▶•		1 2 0 3 0 4 5 6 0 7 9		N 1	Y
Process connection		-				
$G\frac{1}{2}$ " male per EN 837-1 ( $\frac{1}{2}$ " BSP male) (standard for metric pressure ranges mbar, bar) $G\frac{1}{2}$ " male thread and G1/8" female thread $G\frac{1}{4}$ " male per EN 837-1 ( $\frac{1}{4}$ " BSP male) 7/16"-20 UNF male	<b>&gt;</b> •			A B C D		
\(\frac{\''-18 \text{ NPT male (standard for pressure ranges inH2O and psi)}}{\''-18 \text{ NPT female}}\\(\frac{\''-14 \text{ NPT male}}{\''-14 \text{ NPT female}}\\(\frac{\''-16}{\''-20 \text{ UNF female}}\)				E F G H J P		
Special version				Z	P 1	Y
Sealing material between sensor and enclosure		-				
Viton (FPM, standard) Neoprene (CR) Perbunan (NBR) EPDM Special version	<b>&gt;</b> •			A B C D	Q1	Y
Version						
Standard version	<b>&gt;</b>			1		
Further designs						
Supplement the Article No. with "-Z" and add Order code.						
Manufacturer's test certificate M per IEC 60770-2 (calibration certificate) supplied		C11				
Oxygen application, oil and grease-free cleaning (only in conjunction with the sealing material Viton between sensor and enclosure and not with explosiportection version)	sion	E10				
Available av stock						

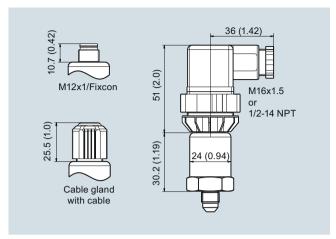
Available ex stock

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

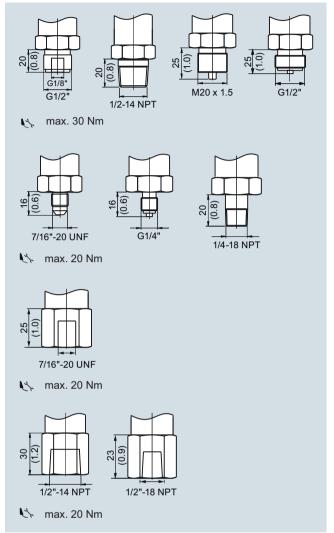
Single-range transmitters for general applications

## SITRANS P200 for gauge and absolute pressure

## Dimensional drawings



SITRANS P200, electrical connections, dimensions in mm (inch)

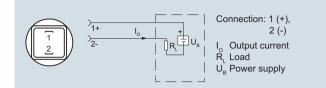


SITRANS P200, process connections, dimensions in mm (inch)

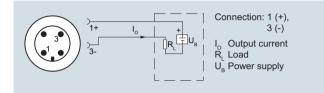
Single-range transmitters for general applications

#### SITRANS P200 for gauge and absolute pressure

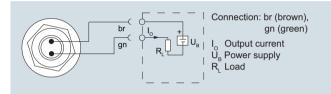
#### **Schematics**



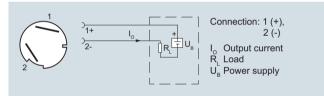
Connection with current output and connector per EN 175301



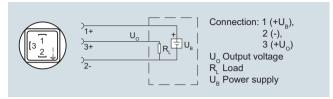
Connection with current output and connector M12x1



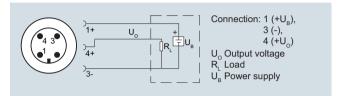
Connection with current output and cable



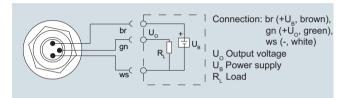
Connection with current output and Quickon cable quick screw connection



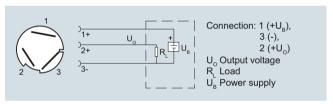
Connection with voltage output and connector per EN 175301



Connection with voltage output and connector M12x1



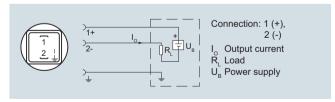
Connection with voltage output and cable



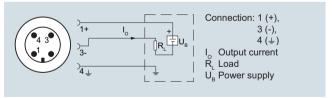
Connection with voltage output and Quickon cable quick screw connection

#### Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

Single-range transmitters for general applications

#### SITRANS P210 for gauge pressure

### Overview



The pressure transmitter SITRANS P210 measures the gauge pressure of liquids, gases and vapors.

- Stainless steal measuring cell
- Measuring ranges 100 to 600 mbar (1.45 to 8.7 psi) relative
- · For low-pressure applications

#### Benefits

- · High measuring accuracy
- Rugged stainless steel enclosure
- · High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- · Compact design

### Application

The pressure transmitter SITRANS P210 for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- · Power engineering
- Chemical industry
- Water supply

### Design

#### Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

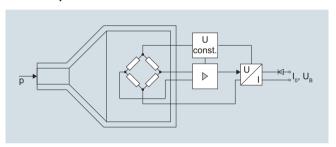
#### Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

### Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

#### Mode of operation



SITRANS P210 pressure transmitters (7MF1566-...), functional diagram

The stainless steel measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Single-range transmitters for general applications

## SITRANS P210 for gauge pressure

Technical specifications			
Application		Design	
Gauge measurement	Liquids, gases and vapors	Weight	Approx. 0.090 kg (0.198 lb)
Mode of operation		Process connections	See dimension drawings
Measuring principle  Measured variable	Piezoresistive measuring cell (stainless steel diaphragm) Gauge pressure	Electrical connections	Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT
Inputs	- Gauge pressure		or Pg 11
Measuring range			<ul> <li>M12 connector</li> <li>2 or 3-wire (0.5 mm<sup>2</sup>) cable</li> </ul>
Gauge pressure	100 600 mbar (1.5 8.7 psi)		<ul><li>(Ø ± 5.4 mm)</li><li>Quickon cable quick screw con-</li></ul>
Output			nection
Current signal	4 20 mA	Wetted parts materials	0
• Load	(U <sub>B</sub> - 10 V)/0.02 A	Measuring cell	Stainless steel, matNo. 1.4435
<ul> <li>Auxiliary power U<sub>B</sub></li> </ul>	DC 7 33 V (10 30 V for Ex)	<ul> <li>Process connection</li> </ul>	Stainless steel, mat. No. 1.4404 (SST 316 L)
Voltage signal	0 10 V DC	Gasket	• FPM (Standard)
• Load	≥ 10 kΩ		Neoprene
<ul> <li>Auxiliary power U<sub>B</sub></li> </ul>	12 33 V DC		<ul><li>Perbunan</li></ul>
Power consumption	$<$ 7 mA at 10 k $\Omega$		• EPDM
Characteristic curve	Linear rising	Non-wetted parts materials	
Measuring accuracy	a Turningly O OF 9/ of full apple	• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
Error in measurement at limit setting incl. hysteresis and reproducibility	<ul> <li>Typical: 0.25 % of full-scale value</li> </ul>	• Rack	Plastic
	Maximum: 0.5 % of full-scale	• cables	PVC
0	value	Certificates and approvals	
Step response time T <sub>99</sub>	< 5 ms	Classification according to pressure equipment directive	For gases of fluid group 1 and liquids of fluid group 1;
Long-term stability  • Lower range value and measuring span	0.25 % of full-scale value/year	(PED 97/23/EC)	meets requirements as per article 3, paragraph 3 (good engineering
Influence of ambient temperature			practice)
Lower range value and measuring	• 0.25 %/10 K of full-scale value	Lloyd's Register of Shipping (LR)	12/20010
span	• 0.5 %/10K of full-scale value	Germanischer Lloyd (GL)	GL19740 11 HH00
	for a measuring range 100 400 mbar	American Bureau of Shipping (ABS)	
Influence of power supply	0.005 %/V	Bureau Veritas (BV)	BV 271007A0 BV A 12553
Conditions of use		Det Norske Veritas (DNV)  Drinking water approval (ACS)	ACS 11 ACC NY 055
Process temperature with gasket		EAC	Nº TC RU C-DE.ΓБ05.B.00732
made of:		LAC	ОС НАНИО «ЦСВЭ»
• FPM (Standard)	-15 +125 °C (+5 +257 °F)	Underwriters Laboratories (UL)	
Neoprene	-35 +100 °C (-31 +212 °F)	<ul> <li>for USA and Canada</li> </ul>	UL 20110217 - E34453
Perbunan	-20 +100 °C (-4 +212 °F)	<ul> <li>worldwide</li> </ul>	IEC UL DK 21845
• EPDM	-40 +145 °C (-40 +293 °F), usable for drinking water	Explosion protection Intrinsic safety "i"	Ex II 1/2 G Ex ia IIC T4 Ga/Gb
Ambient temperature	-25 +85 °C (-13 +185 °F)	(only with current output)	Ex II 1/2 D Ex ia IIIC T125 °C
Storage temperature	-50 +100 °C (-58 +212 °F)		Da/Db
Degree of protection (to EN 60529)	IP 65 with connector per     IP 65 with connector per	EC type-examination certificate	SEV 10 ATEX 0146
	EN 175301-803-A  • IP 67 with M12 connector  • IP 67 with cable	Connection to certified intrinsically- safe resistive circuits with maxi- mum values:	$\label{eq:controller} \begin{array}{l} U_i \leq 30 \text{ V DC}; \ I_i \leq 100 \text{ mA}; \\ P_i \leq 0.75 \text{ W} \end{array}$
	IP 67 with cable quick screw connection	Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0 \text{ nH}; C_i = 0 \text{ nF}$
Electromagnetic compatibility	<ul> <li>acc. IEC 61326-1/-2/-3</li> <li>acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %</li> </ul>	LIV 170001-000-7A and WIZ	

Mounting position

upright

Single-range transmitters for general applications

## SITRANS P210 for gauge pressure

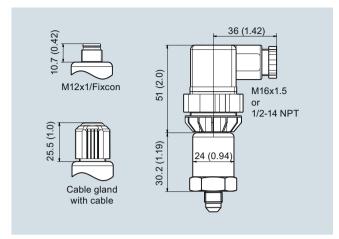
	ordering data						Article No.		Ora	er code
SITRANS P 2 <sup>-</sup> Accuracy typ.		nsmitters for gauge	pressure for low press	ure application	ns		7MF1566			
		ess steel + sealing ma	aterial							
•	arts materials: st	J								
			on in the PIA Life Cycle I	Portal						
Measuring rai		Overload limit	or in the rift Life Oyole i		pressure					
weasuring rai	ige		l	Buist	pressure					
		min.	max.				-			
For gauge pre		1								
0100 mbar	(1.45 psi)	-400 mbar (-5.8 ps	,		(14.5 psi)			3 A A		
0160 mbar 0250 mbar	(2.32 psi) (3.63 psi)	-400 mbar (-5.8 ps	,		(14.5 psi) (29.0 psi)	<b>&gt;</b> •		3 A B 3 A C		
0400 mbar	(5.8 psi)	-800 mbar (-11.6 p	,	' '	(29.0 psi)	<b>&gt;</b>		3 A D		
0400 mbar	(8.7 psi)	-1000 mbar (-14.5 p	,		(43.5 psi)	<b>&gt;</b>		3 A G		
	,	e and plain text:	,   1.7	,	(  /)			9 A A		H 1 Y
	ge: up to n							JAA		
Output signal										
			V DC (10 30 V DC for	ATEX versions)	1	<b>&gt;</b>		0		
	e-wire system; p	power supply 12 33	V DC				-	1 0		
	nection (only 4	20 IIIA)								
None With explosion	protection Exis	a IIC T4				<b>&gt;</b> •		0		
with explosion Electrical con	protection Ex is	a 110 14						1		
			thread M16 (with couplir			<b>&gt;</b>			1	
	d cable, length 5	,	thread PG11 (with coupl	ing)				0	6 7 9	N 1 '
Process conn										
G½" male per G½" male thre	EN 837-1 (½" BS ad and G1/8" fe EN 837-1 (¼" B	male thread	or metric pressure range:	s mbar, bar)		<b>&gt;</b> •			A B C D	
1/4"-18 NPT ma	le (standard for	pressure ranges inH2	O and psi)						E	
1/4"-18 NPT fem									F	
½"-14 NPT ma									G	
½"-14 NPT fem 7/16"-20 UNF f									H	
7/16 -20 UNF 1 M20x1.5 male	enale								J P	
Special version	n								z	P 1 '
•		nsor and enclosure								
Viton (FPM, sta						<b>&gt;</b>			A	
Neoprene (CR	,								В	
Perbunan (NB	,								C	
EPDM .									D	
Special versio	n								Z	Q 1 '
Version										
Standard versi	on									1
Stariuaiu versi										
Further desig	ns									
Further desig		th " <b>-Z</b> " and add Order	code.							

- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ●. For details see page 9/5 in the appendix.

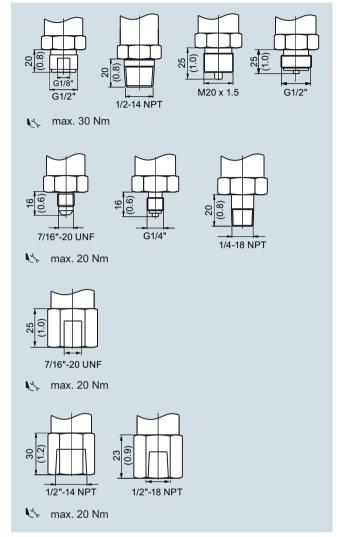
Single-range transmitters for general applications

### **SITRANS P210 for gauge pressure**

### Dimensional drawings



SITRANS P210, electrical connections, dimensions in mm (inch)

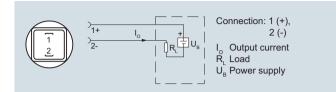


SITRANS P210, process connections, dimensions in mm (inch)

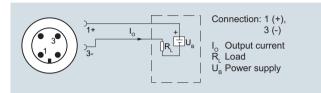
Single-range transmitters for general applications

### SITRANS P210 for gauge pressure

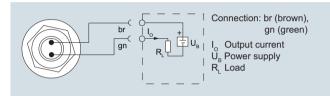
### Schematics



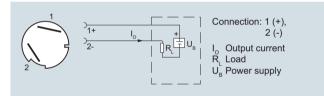
Connection with current output and connector per EN 175301



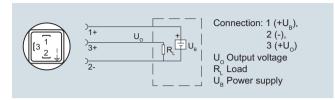
Connection with current output and connector M12x1



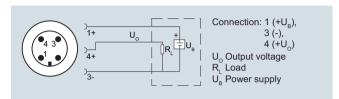
Connection with current output and cable



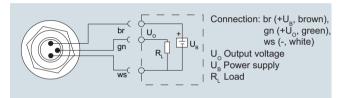
Connection with current output and Quickon cable quick screw connection



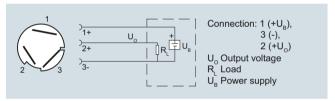
Connection with voltage output and connector per EN 175301



Connection with voltage output and connector M12x1



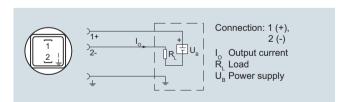
Connection with voltage output and cable



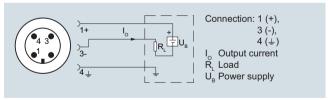
Connection with voltage output and Quickon cable quick screw connection

#### Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

Single-range transmitters for general applications

#### SITRANS P220 for gauge pressure

#### Overview



The pressure transmitter SITRANS P220 measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell, fully welded
- Measuring ranges 2.5 to 1000 bar (36.3 to 14500 psi) relative
- For high-pressure applications and refrigeration technology division

#### Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design
- Gasket-less

#### Application

The pressure transmitter SITRANS P220 for gauge pressure is used in the following industrial areas:

- · Mechanical engineering
- Shipbuilding
- · Power engineering
- Chemical industry
- Water supply

### Design

#### Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

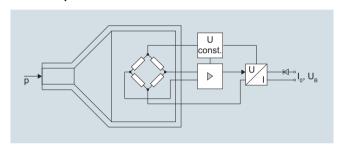
#### Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

#### Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

#### Mode of operation



SITRANS P220 pressure transmitters (7MF1567-...), functional diagram

The stainless steel measuring cell has a thick-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

## Single-range transmitters for general applications

## SITRANS P220 for gauge pressure

Technical specifications			
Application		Design	
Gauge pressure measurement	Liquids, gases and vapors	Weight	Approx. 0.090 kg (0.198 lb)
Mode of operation		Process connections	See dimension drawings
Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)	Electrical connections	<ul> <li>Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT</li> </ul>
Measured variable	Gauge pressure		or Pg 11
Inputs			• M12 connector
Measuring range			<ul> <li>2 or 3-wire (0.5 mm<sup>2</sup>) cable (Ø ± 5.4 mm)</li> </ul>
Gauge pressure     Metric	2.5 1000 bar (36 14500 psi)		Quickon cable quick screw con- nection
- US measuring range	30 14500 psi	Wetted parts materials	
Output	·	Measuring cell	Stainless steel, matNo. 1.4016
Current signal	4 20 mA	<ul> <li>Process connection</li> </ul>	Stainless steel, mat. No. 1.4404
• Load	(U <sub>B</sub> - 10 V)/0.02 A	New weathers are not a second of the	(SST 316 L)
<ul> <li>Auxiliary power U<sub>B</sub></li> </ul>	DC 7 33 V (10 30 V for Ex)	Non-wetted parts materials	
Voltage signal	0 10 V DC	• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Load	≥ 10 kΩ	• Rack	Plastic
<ul> <li>Auxiliary power U<sub>B</sub></li> </ul>	12 33 V DC	• cables	PVC
Power consumption	< 7 mA at 10 k $\Omega$	Certificates and approvals	
Characteristic curve	Linear rising	Classification according to pressure	For gases of fluid group 1 and liq-
Measuring accuracy Error in measurement at limit setting incl. hysteresis and reproducibility	• Typical: 0.25 % of full-scale value	equipment directive (PED 97/23/EC)	uids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
	Maximum: 0.5 % of full-scale	Lloyd's Register of Shipping (LR)	12/20010
	value	Germanischer Lloyd (GL)	GL19740 11 HH00
Step response time T <sub>99</sub>	< 5 ms	American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Long-term stability	0.05.0/ -f.f.:          -	Bureau Veritas (BV)	BV 271007A0 BV
<ul> <li>Lower range value and measuring span</li> </ul>	0.25 % of full-scale value/year	Det Norske Veritas (DNV)	A 12553
Influence of ambient temperature		Drinking water approval (ACS)	ACS 11 ACC NY 055
Lower range value and measuring span	0.25 %/10 K of full-scale value	EAC	№ TC RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ»
Influence of power supply	0.005 %/V	CRN/CSA	pending
Conditions of use		Underwriters Laboratories (UL)	
Process temperature	-30 +120 °C (-22 +248 °F)	• for USA and Canada	UL 20110217 - E34453
Ambient temperature	-25 +85 °C (-13 +185 °F)	• worldwide	IEC UL DK 21845
Storage temperature	-50 +100 °C (-58 +212 °F)	Explosion protection	
Degree of protection (to EN 60529)	<ul> <li>IP 65 with connector per EN 175301-803-A</li> <li>IP 67 with M12 connector</li> </ul>	Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
	• IP 67 with cable	EC type-examination certificate	SEV 10 ATEX 0146
	IP 67 with cable quick screw connection	Connection to certified intrinsically- safe resistive circuits with maxi- mum values:	$ \begin{array}{l} U_i \leq 30 \text{ V DC; } I_i \leq 100 \text{ mA;} \\ P_i \leq 0.75 \text{ W} \end{array} $
Electromagnetic compatibility	<ul> <li>acc. IEC 61326-1/-2/-3</li> <li>acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %</li> </ul>	Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0 \text{ nH}; C_i = 0 \text{ nF}$

Single-range transmitters for general applications

## SITRANS P220 for gauge pressure

	ordering data								Article No.		er code
	20 pressure transr fully-welded versi 0.25 %		or gauge pre	essure, hig	h-pressure a	nd refriger	ration		7MF1567-	A	
, , ,	naterials: stainless	steel									
	arts materials: stain		اد								
<u> </u>											
	e Article No. for the			n the PIA L	ite Cycle Porta						
Measuring ran	nge	Overlo	ad limit			Burst pr	essure				
		Mini- mum		Max.							
or gauge pre	essure	1				1					
) 2.5 bar	(0 36.3 psi)	-1 bar	(-14.5 psi)	6.25 bar	(90.7 psi)	25 bar	(363 psi)	<b>&gt;</b>	3 B D		
) 4 bar	(0 58 psi)	-1 bar	(-14.5 psi)	10 bar	(145 psi)	40 bar	(870 psi)	▶•	3 B E		
) 6 bar	(0 87 psi)	-1 bar	(-14.5 psi)	15 bar	(217 psi)	60 bar	(522 psi)	<b>&gt;</b>	3 B G		
) 10 bar	(0 145 psi)	-1 bar	(-14.5 psi)	25 bar	(362 psi)	60 bar	(870 psi)	<b>&gt;</b>	3 C A		
) 16 bar	(0 232 psi)	-1 bar	(-14.5 psi)	40 bar	(580 psi)	96 bar	(1392 psi)	<b>&gt;</b>	3 C B		
) 25 bar	(0 363 psi)	-1 bar	(-14.5 psi)	62.5 bar	(906 psi)	150 bar	(2176 psi)	<b>&gt;</b>	3 C D		
40 bar	(0 580 psi)	-1 bar	(-14.5 psi)	100 bar	(1450 psi)	240 bar	(3481 psi)	<b>&gt;</b>	3 C E		
) 60 bar	(0 870 psi)	-1 bar	(-14.5 psi)	150 bar	(2175 psi)	360 bar	(5221 psi)	<b>&gt;</b>	3 C G		
	. ,										
) 100 bar	(0 1450 psi)	-1 bar	(-14.5 psi)	250 bar	(3625 psi)	600 bar	(8702 psi)		3 D A		
) 160 bar	(0 2320 psi)	-1 bar	(-14.5 psi)	400 bar	(5801 psi)	960 bar	(13924 psi)		3 DB		
) 250 bar	(0 3625 psi)	-1 bar	(-14.5 psi)	625 bar	(9064 psi)	1500 bar			3 D D		
) 400 bar	(0 5801 psi)	-1 bar	(-14.5 psi)	1000 bar	(14503 psi)	2400 bar			3 DE		
) 600 bar	(0 8702 psi)	-1 bar	(-14.5 psi)	1500 bar	(21755 psi)	2500 bar	,		3 D G		
1000 bar <sup>1)</sup> Other version,	(0 14500 psi) <sup>1)</sup> add Order code ar	Į.	(-14.5 psi) text:	1500 bar	(21755 psi)	5000 bar	(72520 psi)		3 E A 9 A A		H 1 Y
leasuring ran	ge: up to bar (	psi)									
leasuring rar	nges for gauge pro	essure (	•	narket)	(75:)	1	(000:)		425		
	(0 30 psi)		(-14.5 psi)		(75 psi)		(360 psi)		4 B E		
	(0 60 psi)		(-14.5 psi)		(150 psi)		(580 psi)		4 B F		
	(0 100 psi)		(-14.5 psi)		(250 psi)		(580 psi)		4 B G		
	(0 150 psi)		(-14.5 psi)		(375 psi)		(870 psi)		4 C A		
	(0 200 psi)		(-14.5 psi)		(500 psi)		(1390 psi)		4 C B		
	(0 300 psi)		(-14.5 psi)		(750 psi)		(2170 psi)		4 C D		
	(0 500 psi)		(-14.5 psi)		(1250 psi)		(3480 psi)		4 C E		
	(0 750 psi)		(-14.5 psi)		(1875 psi)		(5220 psi)		4 C F		
	(0 1000 psi)		(-14.5 psi)		(2500 psi)		(5220 psi)		4 C G		
	(0 1500 psi)		(-14.5 psi)		(3750 psi)		(8700 psi)		4 D A		
	(0 2000 psi)		(-14.5 psi)		(5000 psi)		(13920 psi)		4 D B		
	(0 3000 psi)		(-14.5 psi)		(7500 psi)		(21750 psi)		4 D D		
	(0 5000 psi)		(-14.5 psi)		(12500 psi)		(34800 psi)		4 D E		
	(0 6000 psi		(-14.5 psi)		(15000 psi)		(34800 psi)		4 D F		
	(0 8700 psi)		(-14.5 psi)		(21000 psi)		(52200 psi)		4 D G		
	(0 14500 psi) <sup>1)</sup>		(-14.5 psi)		(21755 psi)		(72520 psi)		4 E A		
Other version,	add Order code ar	l nd plain		l ng range: .			(: ====  ;-::)		9 A A		H 1 Y
Output signal											
	o-wire system; pow e-wire system; pow				V DC for ATE	X versions)	)	▶•	0 1 0		
	otection (only 4		y 12 00 V L						ľ		
Vone	` ,	,						<b>&gt;</b>	0		
	protection Ex ia II	C T4						<b>&gt;</b>	1		
lectrical con	•										
	DIN EN 175301-80	,	O	ad M16 (w	ith coupling)					1	
Round connec	tor M12 per IEC 61	076-2-1	01							2	
Connection via	a fixed mounted ca	ble, 2 m	(not for type	of protection	on "Intrinsic sat	ety i")			0	3	
	quick screw conne								0	4	
Connector per	DIN EN 175301-80	03-A, stu	ffing box thre	ad 1/2"-14	NPT (with cou	pling)				5	
Connector per	DIN EN 175301-80	03-A, stu	ffing box thre	ad PG11 (v	with coupling)					6	
Fixed mounted	d cable, length 5 m								0	7	
Special version	n									9	N 1 Y
<ul> <li>Available ex</li> </ul>											

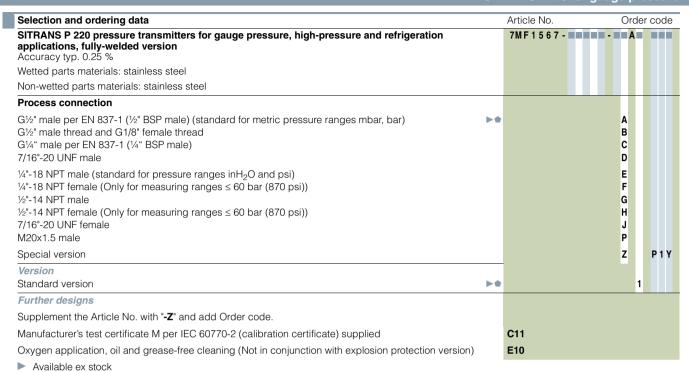
Available ex stock

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

<sup>1)</sup> Approvals pending.

Single-range transmitters for general applications

#### SITRANS P220 for gauge pressure

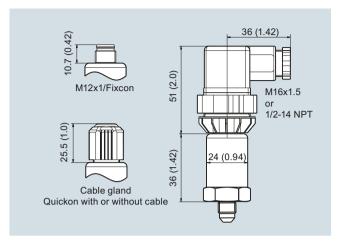


We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

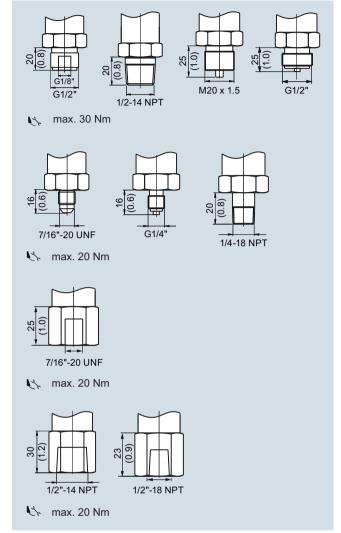
Single-range transmitters for general applications

### **SITRANS P220 for gauge pressure**

### Dimensional drawings



SITRANS P220, electrical connections, dimensions in mm (inch)

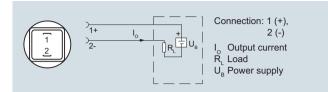


SITRANS P220, process connections, dimensions in mm (inch)

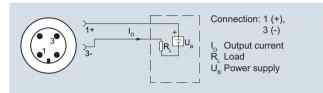
Single-range transmitters for general applications

### SITRANS P220 for gauge pressure

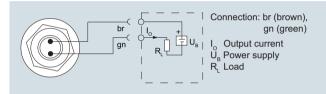
### Schematics



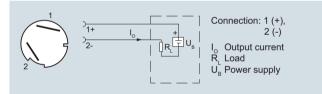
Connection with current output and connector per EN 175301



Connection with current output and connector M12x1



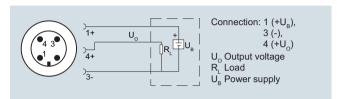
Connection with current output and cable



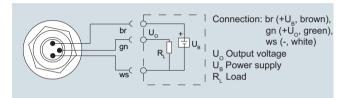
Connection with current output and cable quick screw connection Quickon

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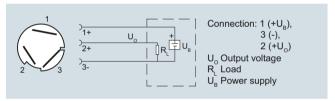
Connection with voltage output and connector per EN 175301



Connection with voltage output and connector M12x1



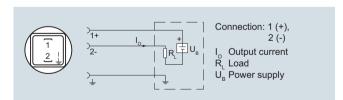
Connection with voltage output and cable



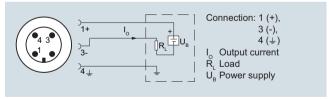
Connection with voltage output and cable quick screw connection Quickon

### Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

Single-range transmitters for general applications

#### SITRANS LH100 Transmitter for hydrostatic level

#### Overview



The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

#### Benefits

- Compact design
- · Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

#### Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

#### Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

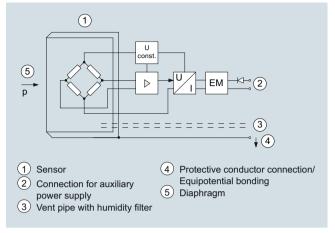
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

#### Function



SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condenstation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

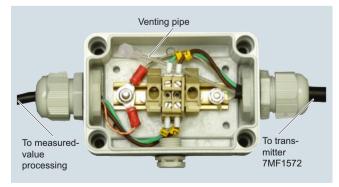
The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

#### Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the junction box, which can be ordered separately, and secured with the cable hanger, also available separately. The junction box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter



Junction box 7MF1572-8AA, open, schematic diagram

Single-range transmitters for general applications

## SITRANS LH100 Transmitter for hydrostatic level



Measuring point setup, generally with junction box 7MF1572-8AA and 7MF1572-8AB cable hanger  $\,$ 

## Technical specifications

Pressure transmitter SITRANS LH10	ou (submersible sensor)
Mode of operation	
Measuring principle	piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 3 mH <sub>2</sub> O (0 9 ftH <sub>2</sub> O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH <sub>2</sub> O (45 ftH <sub>2</sub> O))
• 0 4 mH <sub>2</sub> O (0 12 ftH <sub>2</sub> O)	<ul> <li>1.5 bar (21.8 psi) (corresponds to 15 mH<sub>2</sub>O (45 ftH<sub>2</sub>O))</li> </ul>
• 0 5 mH <sub>2</sub> O (0 15 ftH <sub>2</sub> O)	<ul> <li>1.5 bar (21.8 psi) (corresponds to 15 mH<sub>2</sub>O (45 ftH<sub>2</sub>O))</li> </ul>
• 0 6 mH <sub>2</sub> O (0 18 ftH <sub>2</sub> O)	<ul> <li>1.5 bar (21.8 psi) (corresponds to 15 mH<sub>2</sub>O (45 ftH<sub>2</sub>O))</li> </ul>
• 0 10 mH <sub>2</sub> O (0 30 ftH <sub>2</sub> O)	<ul> <li>3.0 bar (43.5 psi) (corresponds to 30 mH2O (90 ftH2O))</li> </ul>
• 0 20 mH <sub>2</sub> O (0 60 ftH <sub>2</sub> O)	<ul> <li>5.0 bar (72.5 psi) (corresponds to 50 mH<sub>2</sub>O (150 ftH<sub>2</sub>O))</li> </ul>
• 0 0.3 bar	• 1.5 bar
• 0 0.4 bar	• 1.5 bar
• 0 0.5 bar	• 1.5 bar
• 0 0.6 bar	• 1.5 bar
• 0 1 bar • 0 2 bar	• 3.0 bar
_	• 5.0 bar
Output	
Output signal	4 20 mA
Measuring accuracy	According to IEC 60770-1
Error in measurement at limit setting including hysteresis and reproducibility	0.3% of full-scale value (typical)
Measuring range	
• 0 3 mH <sub>2</sub> O (0 9 ftH <sub>2</sub> O bzw. 0 0.3 bar)	0.5 % of full-scale value (typical)
<ul> <li>For all other measuring ranges</li> </ul>	0.3 % of full-scale value (typical)
Influence of ambient temperature	
Measuring range	Zero and span
<ul> <li>3 mH<sub>2</sub>O (9 ftH<sub>2</sub>O or 0.3 bar)</li> <li>4 6 mH<sub>2</sub>O</li> </ul>	0.5 %/10 K of full-scale value 0.45 %/10 K of full-scale value
(12 18 ftH <sub>2</sub> O or 0.40.6 bar) • > 6 mH <sub>2</sub> O ( > 18 ftH <sub>2</sub> O or > 0.6 bar)	0.3 %/10 K of full-scale value
Long-term stability	
	Zero and span
Measuring range	Zero and span
<ul> <li>3 mH<sub>2</sub>O (9 ftH<sub>2</sub>O or 0.3 bar)</li> <li>4 6 mH<sub>2</sub>O         <ul> <li>12 18 ftH<sub>2</sub>O or 0.40.6 bar)</li> </ul> </li> </ul>	0.4 % of full-scale value/year 0.25% of full-scale value/year
• > 6 mH <sub>2</sub> O (> 18 ftH <sub>2</sub> O or > 0.6 bar)	0.2 % of full-scale value/year
Rated conditions	
Ambient conditions	
<ul><li>Process temperature</li><li>Storage temperature</li></ul>	-10 +80 °C (14 176 °F) -40 +80 °C (-40 +176 °F)
Degree of protection according to IEC 60529	IP68
120 00020	

## Single-range transmitters for general applications

## SITRANS LH100 Transmitter for hydrostatic level

Design	
Weight	
Pressure transmitter	≈ 0.2 kg ( ≈ 0.44 lb)
Cable	0.025 kg/m (≈ 0.015 lb/ft)
Electrical connection	Cable with 3 conductors, vent pipe and integrated humidity filter
Material	
Seal diaphragm	Al <sub>2</sub> O <sub>3</sub> ceramic, 96%
Enclosure	Stainless steel, mat. no. 1.4404/316L
Gasket	FPM (standard)
	EPDM (optional)
<ul> <li>Connecting cable</li> </ul>	PE-HD (standard)
	PE-LD (in the case of versions with EPDM seal, suitable for drinking water)
Auxiliary power	
Terminal voltage on pressure transmit-	10 33 V DC
ter U <sub>B</sub>	10 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	Applied for
Drinking water approval (WRAS)	1403525
EAC	№ TC RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ»
Underwriters Laboratories (UL)	2014-11-17 - E344532
The transmitter is not subject to the pressure equipment directive (PED 97/23/EC)	
Explosion protection	
Intrinsic safety "i"	IECEx SEV 14.0003 SEV 14 ATEX 0109
- Marking	II 1 G Ex ia IIC T4 Ga

Junction box					
Application	for connecting the transmitter cable				
Design					
Weight	0.2 kg (0.44 lb)				
Electrical connection	2 x 3-way (28 to 18 AWG)				
Cable entry	2 x Pg 9				
Enclosure material	polycarbonate				
Vent pipe for atmospheric pressure					
Screw for cable strength cord					
Rated conditions					
Degree of protection according to IEC 60529	IP65				
Cable hanger					
Application	for mounting the transmitter				
Design					
Weight	0.16 kg (0.35 lb)				
Material	Galvanized steel, polyamide				

Single-range transmitters for general applications

## SITRANS LH100 Transmitter for hydrostatic level

Selection and ordering data	Article No.		der code
Pressure transmitter	7MF1572-	A	
SITRANS LH100 (submersible sensor)			
For measurement of the hydrostatic			
level through submersion, two-wire system 4 20 mA enclosure			
two-wire system, 420 mA, enclosure material mat. no. 1.4404 (316L), mea-			
suring cell Al <sub>2</sub> O <sub>3</sub> ceramic,			
with permanently mounted PE cable			
✓ Click on the Article No. for the online			
configuration in the PIA Life Cycle			
Portal.			
Measuring range Cable length			
0 3 mH <sub>2</sub> O <sup>1)</sup> 10 m		1 C	
0 4 mH <sub>2</sub> O 10 m		1 D	
0 5 mH <sub>2</sub> O 10 m		1 E	
0 6 mH <sub>2</sub> O 10 m		1 F	
0 10 mH <sub>2</sub> O 20 m		1 H	
0 20 mH <sub>2</sub> O 30 m		1 K	
0 9 ftH <sub>2</sub> O <sup>1)</sup> 33 ft		2 C	
0 12 ftH <sub>2</sub> O 33 ft		2 D	
0 15 ftH <sub>2</sub> O 33 ft		2 E	
0 18 ftH <sub>2</sub> O 33 ft		2 F	
0 30 ftH <sub>2</sub> O 66 ft		2 H	
0 60 ftH <sub>2</sub> O 98 ft		2 K	
0 0.3 bar <sup>1)</sup> 10 m		3 C	
0 0.4 bar 10 m		3 D	
0 0.5 bar 10 m		3 E	
0 0.6 bar 10 m		3 F	
0 1 bar 20 m	:	3 H	
0 2 bar 30 m	:	3 K	
Special versions:			
Measuring ranges for special versions			
between			
0 3 mH <sub>2</sub> O and 0 30 mH <sub>2</sub> O or			
0 9 ftH <sub>2</sub> O and 0 90 ftH <sub>2</sub> O or			
0 0.3 bar and 0 3 bar possible.			
Special cable lenght/Special measur-		9 A	Н
ing range			+
Please add "-Z" to Article No. and			Y 0 1
specify Order code and plain text. Note: Indication of measuring range			
Y01 is always necessary.			
For evaluation of the maximum possible			
cable length following data have to be			
regarded:			
Transmitter:			
C <sub>i</sub> = 0 μF, L <sub>i</sub> = 0 μH Cable:			
$\frac{\text{Oable.}}{\text{C}_{\text{k}} = 0.19 \text{ nF}}$ per meter cable			
$L_{\rm k} = 1.5 \mu{\rm H}$ per meter cable			
The maximum permitted data of the			
transmitter's power supply have to be			
considered!			
3 m (10 ft)			H 1 A
5 m (16 ft)			H 1 B
7 m (23 ft)			H 1 C
10 m (33 ft)			H 1 D
15 m (49 ft)			H1E
20 m (66 ft)			H1F
25 m (82 ft)			H 1 G
30 m (98 ft)			H 1 H
40 m (131 ft)			H 1 J
50 m (164 ft)			H1K
60 m (198 ft) <sup>1)</sup>			H1L
70 m (231 ft) <sup>1)</sup>			H 1 M
10 III (20 I II) :			H 1 N
80 m (264 ft)!)			H I N
80 m (264 ft) <sup>1)</sup> 90 m (297 ft) <sup>1)</sup>			H 1 P

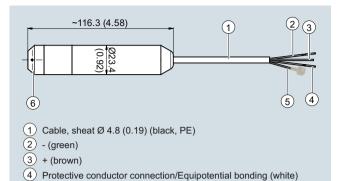
Selection and ordering data		Article No.	Order code
Pressure transmitter SITRANS LH100 (submersible sensor)	1	7MF1572-	A
For measurement of the hydrostatic level through submersion, two-wire system, 420 mA, enclosure material mat. no. 1.4404 (316L), measuring cell Al <sub>2</sub> O <sub>3</sub> ceramic, with permanently mounted PE cable			
Sealing material between sensor and			
<ul><li>enclosure</li><li>FPM (Standard)</li><li>EPDM (for drinking water applications)</li></ul>	•		1 2
Explosion protection • without • With ATEX II1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga	<b>&gt; &gt;</b>		0 1
Additional versions		Order code	
Quality inspection certificate (factory calibration) acc. to IEC 60770-2, add "-Z" to article no. and add order code.		C11	
Indication of measuring range (only at special cable lengths) in " to $mH_2O$ " or " to $ftH_2O$ " or " to $ftH_2O$ "		Y01	
Accessories/spare parts		Article No.	
<b>Junction box</b> for connecting the transmitter cable	<b>&gt;</b>	7MF1572-8AA	
<b>Cable hanger</b> for securing the pressure transmitter	<b>&gt;</b>	7MF1572-8AB	
Protective caps as spare parts (10-pack)	<b>&gt;</b>	7MF1572-8AD	
Humidity filters as spare parts (10-pack)	<b>&gt;</b>	7MF1572-8AE	
Available ex stock			
1)			

1) Approvals pending.

Single-range transmitters for general applications

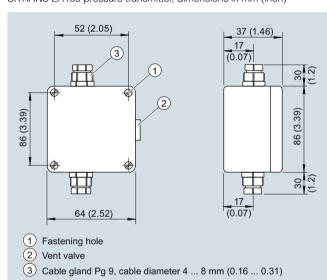
### SITRANS LH100 Transmitter for hydrostatic level

#### Dimensional drawings

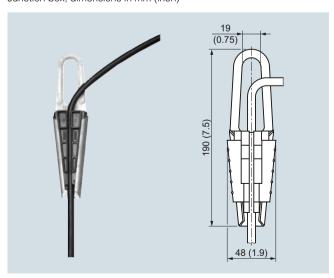


SITRANS LH100 pressure transmitter, dimensions in mm (inch)

Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
 Protective cap with 4 x Ø 2.5 (0.10) holes (black, PPE)



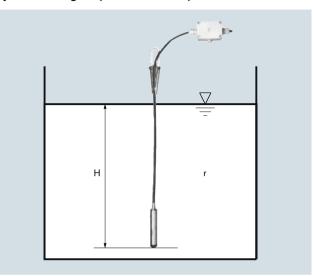
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

#### More information

Determination of the measuring range for media with a density of  $\neq$  1000 kg/m<sup>3</sup> (medium  $\neq$  water)



#### Calculation of the measuring range:

#### $p = \rho x g x H$

with:

 $\rho$  = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Diesel fuel,  $\rho = 850 \text{ kg/m}^3$ Acceleration due to gravity: 9.81 m/s<sup>2</sup>

Start-of-scale: 0 m Maximum level: 6.0 m Cable length: 10 m

Calculation:

 $p = 850 \text{ kg/m}^3 \times 9.81 \text{ m/s}^2 \times 6.0 \text{ m}$ 

 $p = 50 031 \text{ N/m}^2$ p = 500 mbar

Transmitter to be ordered:

#### 7MF1572-1FA11

Plus, if required, junction box 7MF1572-8AA and cable hanger 7MF1572-8AB

Single-range transmitters for general applications

#### SITRANS P Compact for gauge and absolute pressure

#### Overview



The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

Particular value has been placed on a high surface quality. The system can be electropolished in addition.

A further important feature is the hygiene-based design of the process connection by means of various aseptic connections.

The completely welded stainless steel housing can be designed up to degree of protection IP67.

Using appropriate thermal decouplers, the SITRANS P Compact pressure transmitter can be used for process temperatures up to 200  $^{\circ}$ C (392  $^{\circ}$ F).

#### Benefits

- Measuring ranges from 0 to 160 mbar (0 to 2.32 psi) to 0 to 40 bar (0 to 580 psi)
- Linearity error including hysteresis < +0.2 % of full-scale value
- Piezo-resistive measurement system, vacuum-proof and overload-proof
- Hygiene-based design according to EHEDG, FDA and GMP recommendations
- Material and surface quality according to hygiene requirements
- Wetted parts made of stainless steel; completely welded
- Signal output 4 to 20 mA (0 to 20 mA as option)
- Stainless steel housing with degree of protection IP65 (IP67 as option)
- Process temperature up to 200 °C (392 °F)
- Explosion protection II 2G Ex [ib] IIC T6 to ATEX
- Easy and safe to clean

### Application

The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

The SITRANS P Compact pressure transmitter is available in many versions. Exact adaptation of the pressure transmitter to conditions at the place of use is thus possible

#### Design

The electronics is potted to protect it against moisture, corrosive atmospheres and vibration.

#### Notes on operating the pressure transmitter

Compensation of internal atmospheric pressure

Compensation of the internal atmospheric pressure of the SITRANS P Compact pressure transmitters is performed as follows:

- in the plug versions by means of the screwed gland (IP65)
- in the field housings by means of an integral sintered filter (IP65) or a vented cable (IP67)
- in versions with cable outlet by means of a vented cable (IP67)

In the absolute pressure range there is no need for compensation with respect to atmospheric pressure.

**Note**: These degrees of protection are only achieved under the following conditions:

- if the pressure transmitter is installed correctly
- if the screwed glands are securely tightened
- if the cable diameters agree with the nominal diameters of the gaskets in the housing

**Note**: The integral EMC measures are only effective if the earth connection is made correctly.

#### CE marking

The CE marking of the pressure transmitter certifies compliance with the guidelines of the European Council (9/336/EC), the EMC law (13.11.1992), as well as the applicable generic standards.

Interference-free operation in systems and plants is achieved only if the specifications for shielding, earthing, cable routing and electrical isolation are observed during installation and assembly.

#### Hazardous areas

**Note**: Electrical equipment in hazardous areas must only be installed and operated by trained personnel.

Modifications to units and connections result in cancellation of the explosion protection and guarantee.

With intrinsically-safe circuits, make sure that equipotential bonding exists throughout the complete cabling inside and outside of the hazardous area. The limits specified in the ATEX approval must be observed.

Single-range transmitters for general applications

#### SITRANS P Compact for gauge and absolute pressure

#### Function

The process pressure acts on a piezo-resistive semiconductor measuring bridge through a remote seal and a transmission liquid. The pressure transmitter converts the pressure values into a load-independent current.

A compensation network makes the output signal largely independent of the ambient temperature. As a result of a specially adapted remote seal connection with minimized volume, the influence of the process temperature on the output signal is greatly reduced compared to a conventional screw connection.

The pressure transmitters can be powered with a non-regulated DC voltage of 10 to 30 V. Output signals common to measuring technology are available.

### Technical specifications

Pressure transmitters for food, pharmaceuticals and biotechnolog						
Mode of operation						
Measuring principle	piezo-resistive					
Input						
Measured variable	gauge or absolute pressure					
Measuring range	0 160 mbar (0 2.32 psi)					
	 0 40 bar (0 580 psi)					
Output						
Output signal						
• 2-wire system	4 20 mA					
Three-wire system	0 20 mA					
Measuring accuracy	Acc. to IEC 60770-1					
Error in measurement at limit setting incl. hysteresis and reproducibility	≤ 0.2 % of full-scale value					
Adjustment accuracy	$\leq$ ± 0.2 % of full-scale value					
Step response time	< 20 ms					
Influence of ambient temperature						
On the enclosure						
• Zero point	< 0.2 %/10 K of full-scale value					
<ul> <li>Measuring span</li> </ul>	< 0.2 %/10 K of full-scale value					
On the process connection (remote seals)	Zero error (depends on design)					
<ul> <li>Flange remote seal</li> </ul>						
- DN 25 / 1"	4.8 mbar/10 K (0.069 psi/10 K)					
- DN 32 / 11/4"	2.3 mbar/10 K (0.033 psi/10 K)					
- DN 40 / 1½"	1.6 mbar/10 K (0.023 psi/10 K)					
- DN 50 / 2"	0.6 mbar/10 K (0.009 psi/10 K)					
Clamp-on seal						
- DN 25 / 1"	9.5 mbar/10 K (0.14 psi/10 K)					
- DN 32 / 11/4"	4.1 mbar/10 K (0.06 psi/10 K)					
- DN 40 / 1½"	3.9 mbar/10 K (0.05 psi/10 K)					
- DN 50 / 2"	3.9 mbar/10 K (0.05 psi/10 K)					

The zero error specified for the process connection should be considered as a guideline for a standard design. We will produce a detailed system calculation on request. Systems with reduced remote seal errors are available on request.

Rated conditions	
Installation conditions	
<ul> <li>Mounting position</li> </ul>	Any, vertical as standard
Ambient conditions	
<ul> <li>Ambient temperature</li> </ul>	-10 +70 °C (14 158 °F)
Storage temperature	-10 +90 °C (14 194 °F)
Process temperature	Max. 200 °C (392 °F), depending on design
• Degree of protection (to EN 60529)	IP65, optional IP67
<ul> <li>Electromagnetic Compatibility</li> </ul>	
- Emitted interference	To EN 50081 Part 1, issue 1993 (residential and industrial areas). The unit has no own emissions.
- Noise immunity to	EN 50082 Part 2, issue March 1995 (industrial areas)
Design	
Weight (without remote seal)	
• Field enclosure	≈ 460 G (≈ 1.01 (lb)
• Enclosure with plug	≈ 200 g (≈ 0.44 lb)
Enclosure	
• Designs	<ul> <li>Field housing IP65 or IP67, with screwed gland</li> </ul>
	Angled plug DIN 43650, IP65
	<ul><li>Cable connection, IP67</li><li>Round plug connector M12,</li></ul>
	IP65
Material	Stainless steel, mat. no. 1.4404/316L/1.4305
Material of union nut	Polyamide (with electrical connection using plug or cable)
	Electronics unit potted with sili- cone
	Internal ventilation for measuring ranges < 16 bar (< 232 psi), through housing thread or connection cable depending on design
Process connection	
• Versions	See ordering data
Material of coupling	Stainless steel, mat. no. 1.4404/316L
Power supply	
Terminal voltage on transmitter	10 30 V DC
Rated voltage	24 V DC
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord
Explosion protection	
• Intrinsic safety "i"	TÜV 03 ATEX 2099 X
- Marking	Ex II 2G Ex ib IIC T6

Single-range transmitters for general applications

## SITRANS P Compact for gauge and absolute pressure

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. co
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front	7MF8010-		SITRANS P Compact pressure trans- mitters for pressure and absolute pressure with diaphragm flush at front	7MF8010-	
2-wire system	10000-000		2-wire system	1-1-1-1	
Process temperature up to 140 °C (284 °F)			Process temperature up to 140 °C (284 °F)		
Accuracy: 0.2 % of full-scale value			Accuracy: 0.2 % of full-scale value		
Output 4 20 mA			Output 4 20 mA		
Click on the Article No. for the online configuration in the PIA Life Cycle			Diaphragm seal with aseptic connection		
Portal.			Aseptic screwed gland to DIN 11864-1,		
Diaphragm seal			form A, with slotted union nut		
with quick-release clamp			• 1 inch	PM	
Milk pipe union to DIN 11851 with			• 1½ inch	PN	
slotted union nut			• 2 inch	PP	
• DN 25	A D		• 2½ inch	PQ	
• DN 32	AE		Aseptic screwed gland to DIN 11864-1, form A		
• DN 40	AF		with threaded socket		
• DN 50 • DN 65	AG		• 1 inch	QM	
	AH		• 1½ inch	QN	
Milk pipe union to DIN 11851 with threaded socket			• 2 inch	QP	
• DN 25	вр		• 2½ inch	QQ	
• DN 32	BE		Aseptic screwed NEUMO		
• DN 40	BF		with slotted union nut <sup>1)</sup>		
• DN 50	BG		• DN 25	R D	
• DN 65	ВН		• DN 32	RE	
Clamp connection to DIN 32676			• DN 40	RF	
• DN 25	CD		• DN 50	RG	
• DN 40	CF		Aseptic screwed NEUMO		
• DN 50	CG		with threaded socket <sup>1)</sup>		
Clamp connection to ISO 2852			• DN 25	SD	
• 1 inch	DM		• DN 32	SE	
• 1½ inch	DN		• DN 40	SF	
• 2 inch	DP		• DN 50	SG	
• 2½ inch	DQ		Aseptic screwed NEUMO with clamp connection, form R <sup>1)</sup>		
IDF standard with slotted union nut			• DN 25	TD	
• 1 inch	EM		• DN 32	TE	
• 1½ inch	EN		• DN 40	TF	
• 2 inch	EP		• DN 50	TG	
IDF standard with threaded socket			Aseptic screwed NEUMO		
• 1 inch	FM		with clamp connection, form V1)		
• 1½ inch	FN		• DN 25	UD	
• 2 inch	FP		• DN 32	UE	
SMS standard with slotted union nut	0.11		• DN 40	UF	
• 1 inch	GM		• DN 50	UG	
• 1½ inch	G N G P		Male thread DIN 3852 Form A		
<ul> <li>2 inch</li> <li>SMS standard with threaded socket</li> </ul>	ur I		• G½", min. meas. span 1.6 bar (23.2 psi)	XA	
SMS standard with threaded socket  1 inch	нм		• G¾", min. meas. span 1 bar (14.5 psi)	XB	
• 1½ inch	HN		• G1", min. meas. span 0.4 bar (5.8 psi)	XC	
• 2 inch	HP		<ul> <li>G1½", min. meas. span 0.25 bar (3.63 psi)</li> </ul>	XD	
DRD flange, without welding-type flange			• G2", min. meas. span 0.16 bar	XE	
• DN 50, PN 40	J H		(2.32 psi)	~~	
Varivent connection (Tuchenhagen)			Special version	ZA	J 1 Y
• D = 50, for Varivent housing DN 25 and	KF		(add Order code and plain text)		
1 inch			Filling liquid		
<ul> <li>D = 68, for Varivent housing</li> </ul>	KL		Food oil, FDA-listed	3	
DN 40 DN 125 and 1½ 6 inch			Medicinal white oil	2	
Special version (add Order pade and plain toxt)	ZA	J 1 Y	Special version	9	L 1 Y
(add Order code and plain text)			(add Order code and plain text)		
Filling liquid			Output signal		
Food oil, FDA-listed	3		4 20 mA	1	
Medicinal white oil	2		Special version	9	M 1 Y
Special version (add Order code and plain text)	9	L 1 Y	(add Order code and plain text)		
· , ,	-		1) Please specify as well:		
<b>Output signal</b> 4 20 mA	1		Connections for pipes: R01, R02 or R03, se	e table "Further de	esigns" on r
4 20 IIIA			page		<b>J</b>
Special version	9	M 1 Y			

Single-range transmitters for general applications

## SITRANS P Compact for gauge and absolute pressure

SITRANS P Compact for gauge ar	id absolute	pressure				
Selection and Ordering data	Article No.	Ord. code	Selection and Order	ring data	Article No.	Ord. code
SITRANS P Compact pressure trans- mitters for pressure and absolute pressure with diaphragm flush at front	7 M F 8 0 1 0 - SITRANS P Compact pressure trans mitters for pressure and absolute pressure with diaphragm flush at fro		and absolute			
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 20 mA	1 - 1 - 1 - 1 - 1		2-wire system Process temperature Accuracy: 0.2 % of fu Output 4 20 mA		1 - 1 - 1 - 1	
Housing design (stainless steel mat. No. 1.4404/316L) / electr. connection Housing with angled plug to DIN 43650.	1		Measured range (continued)	Overload pres- sure		
IP65			-1 +9 bar	30 bar		à A
Housing with round plug M12, IP65, union nut made of polyamide	2		(-14.5 +130.5 psi) -1 +15 bar	(435 psi) 50 bar		àВ
Housing with round plug M12, IP65, union nut made of stainless steel	3		(-14.5 +217.6 psi) 0 1 bar a	(725 psi) 10 bar a	ŀ	IA.
Stainless steel field housing (small) with cable gland, IP65	4		(0 14.5 psia) 0 1.6 bar a	(145 psia) 10 bar a		ıв
Stainless steel field housing (small) with cable gland, IP67	5		(0 23.2 psia) 0 2.5 bar a (0 36.3 psia)	(145 psia) 16 bar a (232 psia)	H	ıc
Internal ventilation for measuring ranges < 10 bar (< 145 psi)			0 4 bar a (0 58 psia)	16 bar a (232 psia)	H	ID
Measured range O 160 mbar 2 bar (0.0.00 msi)	В	В	0 6 bar a (0 87 psia)	30 bar a (435 psia)	H	IE
(0 2.32 psi) (29 psi) 0 250 mbar 2 bar (0 3.63 psi) (29 psi)	В	c	0 10 bar a (0 145 psia)	30 bar a (435 psia)	·	IA
0 400 mbar 6 bar (0 5.8 psi) (87 psi)	В	D	Special version (add Order code and	d plain text)	2	A P1Y
0 600 mbar 6 bar (0 8.7 psi) (87 psi)	В	E	Explosion protection without	n		1
0 1 bar 10 bar (0 14.5 psi) (145 psi)	C.	Α	with, to ATEX 100a, I	I 2 G, Ex ib IIC T6	Order code	2
0 1.6 bar 10 bar (0 23.2 psi) (145 psi)	C		Further designs Please add "-Z" to Art	ticle No. and specify	Order code	
0 2.5 bar 16 bar (0 36.3 psi) (232 psi)	C		Order code Hygiene version		P01	
0 4 bar 16 bar (0 58 psi) (232 psi) 0 6 bar 30 bar	C		Roughness of procest Foil R <sub>a</sub> < 0.8 µm (3.1	5·10 <sup>-8</sup> inch):		
(0 87 psi) (435 psi)			Welded seams R <sub>a</sub> < (5.9·10 <sup>-8</sup> inch)			
0 10 bar 30 bar (0 145 psi) (435 psi) 0 16 bar 50 bar	D.		Process temperature (392 °F) instead of 14	max. 200 °C	K01	
(0 232 psi) (725 psi) 0 25 bar 50 bar	D		Connections for pip	,		
(0 363 psi) (725 psi) 0 40 bar 70 bar	D		Pipes to DIN 11850 ISO pipes to DIN 246		R01 R02	
(0 580 psi) (1015 psi) -160 0 mbar 2 bar	E	В	Pipes to O. D. Tubing  Certificates	g "BS 4825 Part 1"	R03	
(-2.32 0 psi) (29 psi) -250 0 bar 2 bar	E		Quality inspection ce (Factory calibration)		C11	
(-3.73 0 psi) (29 psi) -400 0 bar 6 bar	E	D	Inspection certificate Use of FDA-listed rer		C12 C17	
(-5.8 0 psi) (87 psi) -600 0 bar 6 bar (-8.7 0 psi) (87 psi)	E	E	liquids certified by te EN 10204-2.2			
-1 0 bar 10 bar (-14.5 0 psi) (145 psi)	F	A	Roughness depth me certified by test repo	easurement R <sub>a</sub> rt to EN 10204-3.1	C18	
-1 0.6 bar 10 bar (-14.5 8.7 psi) (145 psi)	F		Certification to EHED seals with aseptic so		C19	
-1 1.5 bar 16 bar (-14.5 21.8 psi) (232 psi) -1 3 bar 16 bar	F		to DIN 11864			
(-14.5 43.5 psi) (232 psi)	F					
-1 5 bar 30 bar (-14.5 72.5 psi) (435 psi)	F					

Single-range transmitters for general applications

# SITRANS P Compact for gauge and absolute pressure

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure trans- mitters for pressure and absolute pressure with clamp-on remote seal	7MF8010-	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 20 mA	2	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Clamp-on remote seal (screwed gland		
at both ends) with quick-release clamps		
Milk pipe union to DIN 11851 with		
threaded socket	4.5	
• DN 25	A D A E	
• DN 32 • DN 40	AF	
• DN 50	AG	
• DN 65	AH	
Clamp connection to DIN 32676	711	
• DN 25	CD	
• DN 32	CE	
• DN 40	CF	
• DN 50	CG	
• DN 65	СН	
Clamp connection to ISO 28521)		
• 1 inch	DM	
• 1½ inch	DN	
• 2 inch	DP	
• 2½ inch	DQ	
Special version	ZA	J 1 Y
(add Order code and plain text)		
Filling liquid		
Food oil, FDA-listed	3	
Medicinal white oil	2	
Special version	9	L 1 Y
(add Order code and plain text)		
Output signal 4 20 mA	1	
Special version	9	M 1 Y
(add Order code and plain text)		

<sup>1)</sup> Please note the internal diameter of the pipe. Please specify pipe classes (see "Further designs")

Selection and Ordering data	Article No.	Ord. code
Selection and Ordering data		Ora. code
SITRANS P Compact pressure trans- mitters for pressure and absolute pressure with clamp-on remote seal	7MF8010-	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 20 mA	2	-
Clamp-on seal with aseptic connection		
Aseptic screwed gland to DIN 11864-1, form A with threaded socket		
• 1 inch	QM	
• 1½ inch	QN	
• 2 inch	QP	
Aseptic screwed NEUMO with threaded socket 1)		
• DN 25	SD	
• DN 32	SE	
• DN 40	SF	
• DN 50	SG	
• DN 65	SH	
Aseptic screwed NEUMO		
with clamp connection, form R <sup>1)</sup>		
• DN 25	TD	
• DN 32	TE	
• DN 40	TF	
• DN 50	TG	
Aseptic screwed gland SÜDMO with threaded socket W 501		
• 1 inch	VM	
• 1½ inch	VN	
• 2 inch	V P	
Aseptic screwed gland SÜDMO with clamp connection W 601		
• 1 inch	WM	
• 1½ inch	WN	
• 2 inch	WP	
Special version	ZA	J 1 Y
(add Order code and plain text)		
Filling liquid		
Food oil, FDA-listed	3	
Medicinal white oil	2	
Special version	9	L 1 Y
(add Order code and plain text)		
Output signal 4 20 mA	1	
	9	M 1 Y
Special version (add Order code and plain text)	9	IVI I Y
(add Order code and plain text)		

Please specify as well: Connections for pipes: R01, R02 or R03, see table "Further designs" on next page

Single-range transmitters for general applications

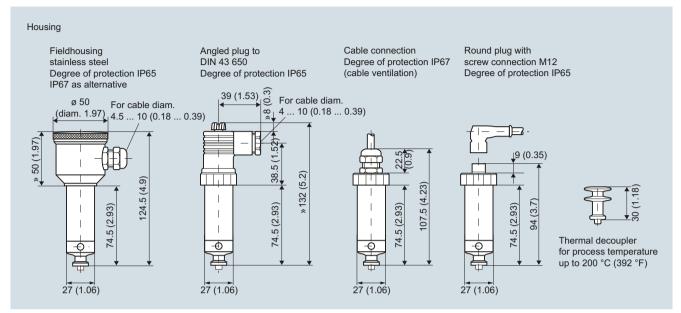
# SITRANS P Compact for gauge and absolute pressure

Selection and Ord	lering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS P Comp	act pressure trans-	7 M F 8 0 1 0 -		SITRANS P Compact pressure trans- mitters for pressure and absolute pressure with clamp-on remote seal	7 M F 8 0 1 0 -	
2-wire system Process temperatur Accuracy: 0.2 % of Output 4 20 mA	e up to 140 °C (284 °F) full-scale value	2		2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 20 mA	2	П
	stainless steel mat.			Measured range Overload pressure (continued)		
	ed plug to DIN 43650, de of polyamide d plug M12, IP65, polyamide d plug M12, IP65,	1 2 3		-1 9 bar 30 bar (-14.5 130.5 psi) (435 psi) -1 15 bar 50 bar (-14.5 217.6 psi) (725 psi) 0 1 bar a 10 bar a	GA GB HA	
	Housing (small) with	4		(0 14.5 psia) (145 psia) 0 1.6 bar a 10 bar a	нв	
cable gland, IP67	housing (small) with for measuring ranges i)	5		(0 23.2 psia) (145 psia) 0 2.5 bar a 16 bar a (0 36.3 psia) (232 psia) 0 4 bar a 16 bar a (0 58 psia) (232 psia)	нс н <b>р</b>	
<b>Measured range</b> 0 160 mbar	Overload pressure 2 bar	ВВ		0 6 bar a 30 bar a (0 87 psia) (435 psia)	HE	
(0 2.32 psi) 0 250 mbar	(29 psi) 2 bar	ВС		0 10 bar a 30 bar a (0 145 psia) (435 psia)	J A	
(0 3.63 psi) 0 400 mbar (0 5.8 psi)	(29 psi) 6 bar (87 psi)	ВД		Special version (add Order code and plain text)	ZA	P 1 Y
0 600 mbar (0 8.7 psi)	6 bar (87 psi)	B E Explosion protection without		1		
0 1 bar (0 14.5 psi)	10 bar (145 psi)	with, to ATEX 100a, II 2 G, Ex ib IIC T6  Further designs		Order code		
0 1.6 bar (0 23.2 psi)	10 bar (145 psi)	СВ		Please add "-Z" to Article No. and specify Order code	Order code	
0 2.5 bar (0 36.3 psi)	16 bar (232 psi)	CC		Hygiene version	P01	
0 4 bar (0 58 psi) 0 6 bar (0 87 psi)	16 bar (232 psi) 30 bar (435 psi)	CD		Roughness of process connection: Foil $R_a < 0.8 \mu m$ (3.15·10 <sup>-8</sup> inch); Welded seams $R_a < 1.5 \mu m$ (5.9·10 <sup>-8</sup> inch)		
0 10 bar	30 bar	DA		Integral cooling element	K01	
(0 145 psi) 0 16 bar (0 232 psi)	(435 psi) 50 bar (725 psi)	DB		Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)		
0 25 bar	50 bar	DC		Connections for pipe Pipes to DIN 11850	R01	
(0 363 psi) 0 40 bar (0 580 psi)	(725 psi) 70 bar (1015 psi)	D D		ISO pipes to ISO 2463 Pipes to O. D. Tubing "BS 4825 Part 1"	R02 R03	
-160 0 mbar	2 bar	EB		Certificates	044	
(-2.32 0 psi) -250 0 bar (-3.73 0 psi)	(29 psi) 2 bar (29 psi)	EC		Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	
-400 0 bar (-5.8 0 psi) -600 0 bar	6 bar (87 psi)	E D E E		Inspection certificate to EN 10204-3.1 Use of FDA-listed remote seal filling liquids certified by test report	C12 C17	
(-8.7 0 psi)	6 bar (87 psi)			to EN 10204-2.2		
-1 0 bar (-14.5 0 psi) -1 0.6 bar	10 bar (145 psi) 10 bar	FA FB		Roughness depth measurement R <sub>a</sub> certified by test report to EN 10204-3.1	C18	
(-14.5 8.7 psi) -1 1.5 bar	(145 psi) 16 bar	FC		Certification to EHEDG for clamp-on seals with aseptic screwed gland	C19	
(-14.5 21.8 psi) -1 3 bar	(232 psi) 16 bar	F D		to DIN 11864		
(-14.5 43.5 psi) -1 5 bar	(232 psi) 30 bar	FE				
(-14.5 72.5 psi)	(435 psi)					

Single-range transmitters for general applications

### SITRANS P Compact for gauge and absolute pressure

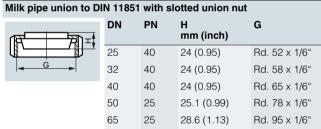
### Dimensional drawings



SITRANS P Compact, dimensions in mm (inch)

### **Process connections**

Diaphragm seal with quick-release clamp



			` '				
Milk pipe union to DI	Milk pipe union to DIN 11851 with threaded socket						
	DN	PN	н	G			
1/2//2n -1	J.,		mm (inch)	_			
	25	40	-	Rd. 52 x 1/6"			
G →	32	40	20 (0.79)	Rd. 58 x 1/6"			
	40	40	20 (0.79)	Rd. 65 x 1/6"			
	50	25	20 (0.79)	Rd. 78 x 1/6"			
	65	25	22 (0.87)	Rd. 95 x 1/6"			

Clamp connection to DIN 32676					
<u>‡</u> _	DN	PN	H mm (inch)	D mm (inch)	
<b>1</b>	25	16	14 (0.55)	50.5 (2)	
' D '	40	16	14 (0.55)	50.5 (2)	
	50	16	14 (0.55)	64 (2.52)	

Clamp connection to ISO 2852					
<u></u>	DN	PN	H mm (inch)	D mm (inch)	
<b>V</b> -	1"	16	14 (0.55)	50.5 (2)	
, D ,	11/2"	16	12 (0.47)	50.5 (2)	
	2"	16	14 (0.55)	64 (2.52)	
	21/2"	16	14 (0.55)	77.5 (3.05)	

IDF standard with slotted union nut						
T = 1	DN	PN	H mm (inch)	G inch (IDF thread)		
	1"	40	21 (0.83)	1"		
G	11/2"	40	13.5 (0.53)	1½"		
11	2"	25	15 (0.59)	2"		

IDF standard with threaded socket						
	DN	PN	H mm (inch)	G inch (IDF thread)		
	1"	40	21 (0.83)	1"		
G	1½"	40	13.5 (0.53)	11/2"		
17	2"	25	15 (0.59)	2"		

SMS standard with slotted union nut					
B T T	DN	PN	H mm (inch)	G	
	1"	40	16 (0.63)	Rd 40 x 1.6"	
G	1½"	40	16 (0.63)	Rd 60 x 1.6"	
	2"	25	16 (0.63)	Rd 70 x 1.6"	

SMS standard with threaded socket				
d//////	DN	PN	H mm (inch)	G
	1"	40	16 (0.63)	Rd 40 x 1.6"
G →	1½"	40	20 (0.79)	Rd 60 x 1.6"
	2"	25	20 (0.79)	Rd 70 x 1.6"

DRD flange, without welding-type flange					
<u>n                                     </u>	DN	PN	H mm (inch)	D mm (inch)	
D 1	50	40	16.7 (0.66)	65.5 (2.58)	

Single-range transmitters for general applications

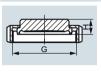
### SITRANS P Compact for gauge and absolute pressure

# Varivent connection

DN	PN	H mm (inch)	D mm (inch)
25	25	19 (0.75)	50 (1.97)
40 125	25/10	19 (0.75)	68 (2.68)

### Diaphragm seal with aseptic connection

# Aseptic screwed gland to DIN 11864-1, form A, with slotted union nut



DN	PN	H mm (inch)	G
1"	40	20 (0.79)	Rd 52 x 1/6"
1½"	40	20 (0.79)	Rd 58 x 1/6"
2"	25	20 (0.79)	Rd 65 x 1/6"
21/2"	25	20 (0.79)	Rd 78 x 1/6"

# Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



DN	PN	H mm (inch)	G
1"	40	15 (0.59)	Rd 52 x 1/6"
11/2"	40	15 (0.59)	Rd 58 x 1/6"
2"	25	15 (0.59)	Rd 65 x 1/6"
21/2"	25	15 (0.59)	Rd 78 x 1/6"

### Aseptic screwed NEUMO BioConnect with slotted union nut



DN	PN	H mm (inch)	G
25	16	15 (0.59)	M 42 x 2
32	16	15 (0.59)	M 52 x 2
40	16	15 (0.59)	M 56 x 2
50	16	15 (0.59)	M 68 x 2

### Aseptic screwed NEUMO BioConnect with threaded socket



Ī	DN	PN	H mm (inch)	G
	25	16	20 (0.79)	M 42 x 2
	32	16	20 (0.79)	M 52 x 2
ı	40	16	20 (0.79)	M 56 x 2
	50	16	20 (0.79)	M 68 x 2

# Aseptic screwed NEUMO BioConnect with clamp connection, form R



DN	PN	H mm (inch)	D mm (inch)
25	40	20 (0.79)	50.5 (2)
32	40	20 (0.79)	50.5 (2)
40	40	20 (0.79)	64 (2.52)
50	25	20 (0.79)	77.4 (3.05)

# Aseptic screwed NEUMO BioConnect with clamp connection, form V



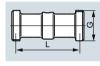
DN	PN	H mm (inch)	D mm (inch)
25	40	15 (0.59)	50.5 (2)
32	40	15 (0.59)	50.5 (2)
40	40	15 (0.59)	64 (2.52)
50	25	15 (0.59)	77.4 (3.05)

# Male thread DIN 3852, form A G d mm (inch) dm dinch) dm (inch) dm

	(inch)	(inch)	(inch)	(inch)	(inch)
G½A	26 (1.02)	17.5 (0.69)	27 (1.06)	14 (0.55)	27 (1.06)
G¾A	32 (1.26)	22.6 (0.89)	31 (1.22)	16 (0.63)	32 (1.26)
G1A	39 (1.54)	27 (1.06)	33 (1.30)	18 (0.71)	51 (2.01)
G11/2A	55 (2.17)	40 (1.57)	40 (1.57)	22 (0.87)	55 (2.17)
G2A	68 (2.68)	51 (2.00)	42 (1.65)	24 (0.94)	70 (2.76)

Clamp-on remote seal (screwed gland at both ends) with quick-release clamps

### Milk pipe union to DIN 11851 with threaded socket



d

DN	PN	L mm (inch)	G
25	40	110 (4.33)	Rd 52 x 1/6"
32	40	110 (4.33)	Rd 58 x 1/6"
40	40	110 (4.33)	Rd 65 x 1/6"
50	25	110 (4.33)	Rd 78 x 1/6"
65	25	110 (4.33)	Rd 95 x 1/6"

### Clamp connection to DIN 32676



DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.5 (2)
32	16	110 (4.33)	50.5 (2)
40	16	110 (4.33)	50.5 (2)
50	16	110 (4.33)	64 (2.52)
65	10	110 (4.33)	91 (3.58)

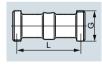
### Clamp connection to ISO 2852



		_		
	DN	PN	L mm (inch)	D mm (inch)
ļ	1"	16	110 (4.33)	50.5 (2)
	11/2"	16	110 (4.33)	50.5 (2)
	2"	16	110 (4.33)	64 (2.52)
	21/2"	16	110 (4.33)	91 (3.58)

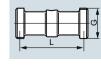
Clamp-on seal with aseptic connection

# Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



DN	PN	L mm (inch)	G
1"	40	110 (4.33)	Rd 52 x 1/6"
11/2"	40	110 (4.33)	Rd 65 x 1/6"
2"	25	110 (4.33)	Rd 78 x 1/6"

### Aseptic screwed NEUMO BioConnect with threaded socket



Ī	DN	PN	L mm (inch)	G
	25	16	110 (4.33)	M 42 x 2
	32	16	110 (4.33)	M 52 x 2
	40	16	110 (4.33)	M 56 x 2
	50	16	110 (4.33)	M 68 x 2
	65	16	110 (4.33)	M 90 x 3

Single-range transmitters for general applications

### SITRANS P Compact for gauge and absolute pressure

# Aseptic screwed NEUMO BioConnect with clamp connection, form R



DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.4 (2)
32	16	110 (4.33)	50.4 (2)
40	16	110 (4.33)	64 (2.52)
50	16	110 (4.33)	77.4 (3.05)

### Aseptic screwed gland SÜDMO with threaded socket W 501



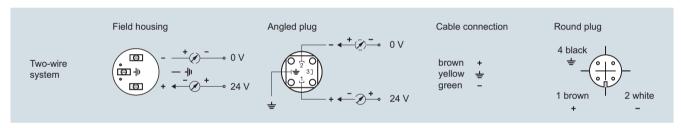
DN	PN	L mm (inch)	G
1"	25	110 (4.33)	Rd 44 x 1/6"
1½"	25	110 (4.33)	Rd 58 x 1/6"
2"	20	110 (4.33)	Rd 78 x 1/6"

### Aseptic screwed gland SÜDMO with threaded socket W 601



	DN	PN	L mm (inch)	D mm (inch)
	1"	16	110 (4.33)	50.5 (2)
	11/2"	16	110 (4.33)	64 (2.52)
ı	2"	16	110 (4.33)	77.5 (3.05)

### Schematics



 ${\it SITRANS\ P\ Compact,\ connection\ diagram}$ 

Transmitters with WirelessHART

### SITRANS P280 for gauge and absolute pressure

### Overview



SITRANS P280 for flexible and cost-effective applications in pressure monitoring

- Supports the WirelessHART standard (HART V 7.1)
- · Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum display and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) can be activated and deactivated device with push of a button
- Battery power supply
- Battery service live up to 5 years
- Extend battery service life with HART modem interface which can be shut off
- Optimized power consumption through new design, and increase in battery service life.
- Simple configuration thanks to SIMATIC PDM
- Device meets IP65 degree of protection
- Can be used for absolute and gauge pressure measurements

### Benefits

The SITRANS P280 is a pressure transmitter that features Wireless HART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible pressure measurements
- Save costs on writing for difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring cost would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes.
- Easy installation on moveable equipment
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and new possibilities for system solutions in process automation

### Application

The SITRANS P280 is a WirelessHART field device for measuring absolute and gauge pressure.

The measuring ranges for absolute and gauge pressure measurements are 0 to 1.6, 10, 50, 200 and 320 bar (0 to 23, 145, 725, 2900 and 4641 psi).

The sensor is integrated into the transmitter housing.

On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial comissioning, alternatively the device can be commissioned comfortably by means of the local pushbuttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

### Design

The SITRANS P280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operating temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The aerial features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the option for direct operation on the device. The operating strategy used in this case seamlessly integrates into the strategy of all new Siemens field devices.

Using the device's control buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the service life of the battery.

The SITRANS P280 transmitter features a ceramic measuring cell for gauge and absolute pressure measurements.

### Function

The SITRANS P280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transported via the network to the SIEMENS IE/WSN-PA link.

Field device data received by the IE/WSN-PA LINK is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. For an introduction of WirelessHART, please see the FI 01 catalogue, section 8 or http://www.siemens.com/wirelesshart.

Detailed information on IE/WSN-PA can be found in the FI 01 catalogue, section 7 or http://www.siemens.com/wirelesshart.

Transmitters with WirelessHART

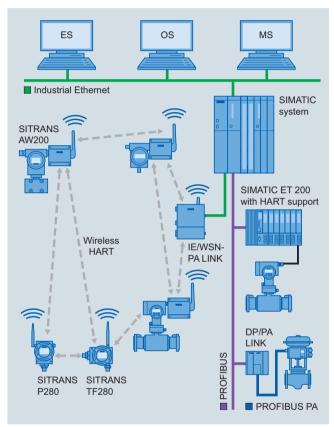
### SITRANS P280 for gauge and absolute pressure

### Integration

### Connecting to SIMATIC PCS 7

The integration of field devices in SIMATIC PCS 7 and other process control systems can now be done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no MSR wiring is available.

Where larger distances between the IW/WSN-PA LINK and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the products of the SCALANCE W family.



Integration of a meshed network in SIMATIC PCS7

### Configuration

Configuration of the SITRANS P280 may be carried out as follows:

- Initial comissioning for the SITRANS P280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network, the onsite HART modem or via the local user interface.
- Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

### Technical specifications

SITRANS P280 WirelessHART pressure transmitter				
Mode of operation  Measuring principle	piezo-resistive			
Measured variable				
Gauge pressure input	Gauge and absolute pressure			
Measuring range  0 1.6 bar (0 23 psi)  0 10 bar (0 145 psi)  0 50 bar (0 725 psi)  0 200 bar (0 2900 psi)  0 320 bar (0 4641 psi)  Units	Overload limit/Bursting pressure 4 bar (58 psi) 20 bar (290 psi) 100 bar (1450 psi) 400 bar (5801 psi) 640 bar (9282 psi) mbar, bar, m4H <sub>2</sub> O, i4H <sub>2</sub> O, atm,			
	Torr, gcm², kgcm², Pa, kPa, MPa, psi, mmHG, mmH <sub>2</sub> O, ftH <sub>2</sub> O, inHG, inH <sub>2</sub> O			
Absolute pressure input				
Measuring range  0 1.6 bar a (0 23 psia)  0 10 bar a (0 145 psia)  0 50 bar a (0 725 psia)  0 200 bar a (0 2900 psia)  0 320 bar a (0 4641 psia)  Units	Overload limit/Bursting pressure 4 bar a (58 psia) 20 bar a (290 psia) 100 bar a (1450 psia) 400 bar a (5801 psia) 640 bar a (9282 psia) mbar, bar, m4H <sub>2</sub> O, i4H <sub>2</sub> O, atm,			
	Torr, gcm², kgcm², Pa, $\bar{k}$ Pa, MPa, psi, mmHG, mmH $_2$ O, ftH $_2$ O, inHG, inH $_2$ O			
Output				
Output signal	2.4 GHz Wireless signal with TSMP (Time Synchronized Mesh Protocol)			
Measuring accuracy	as per IEC 60770-1			
Error in measurement at limit setting incl. hysteresis and reproducibility	typ. 0.17 % of sensor's span max. 0.25 % of sensor's span			
Long-term stability	max. $\pm$ 0.25 % of sensor/year span			
Influence of ambient temperature	typ. 0.07 %/10K, max. 0.2 %/10 K of sensor's span			
Rated conditions				
Ambient conditions				
Ambient temperature	-40 +80 °C (-40 +176 °F) (in ambient temperatures below -20 °C (-4 °F) and above +70 °C (158 °F), readability of the display is limited.)			
Storage temperature	-40 +85 °C (-40 +185 °F)			
Relative humidity	< 95 %			
Climatic class	4K4H in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)			
Degree of protection	IP65/NEMA 4			
Allowable media temperature	-40 +85 °C (-40 +185 °F)			

# Transmitters with WirelessHART

# SITRANS P280 for gauge and absolute pressure

Design	
Enclosure material	low-copper die-cast aluminum, AC-AlSi12(Fe)
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95
Resistance to vibration	in accordance with DIN EN 60068-2-6/ 12.07
Weight	
• without battery	1.5 kg (3.31 lb)
With battery	1.6 kg (3.53 lb)
Dimensions (W x H x D)	See Dimensional drawing
Process connection	<ul> <li>G½B male thread as per EN 837-1</li> <li>½-14 NPT</li> </ul>
Sensor break	
Displays and controls	Is recognized
Display (with illumination)	
Size of display	104 x 80 pixels
Number of digits	adjustable
Number of spaces after comma	adjustable
Setting options	• on site with 3 buttons
county opiions	with SIMATIC PDM or HART- Communicator
Power supply	
Battery	3.6 V DC
Communication	
Radio	WirelessHART V7.1 conforming
Transmission frequency band	2.4 GHz (ISM-Band)
Transmission range under reference conditions	Up to 250 m (line of sight) in outside areas
	Up to 50 m (greatly dependent on obstacles) in inside areas
Communication interfaces	<ul> <li>HART communication with HART modem</li> </ul>
	WirelessHART
Certificates and approvals	
Wireless communication approvals	R&TTE, FCC
General Product Safety	CSA <sub>US/C</sub> , CE, UL
Classification according to pressure equipment directive	Gases: Fluid group 1
(PED 97/23/EC)	Liquids: Fluid group 1; meets requirements as per Sec-
	tion 3, Subsection 3 (sound engineering practice)

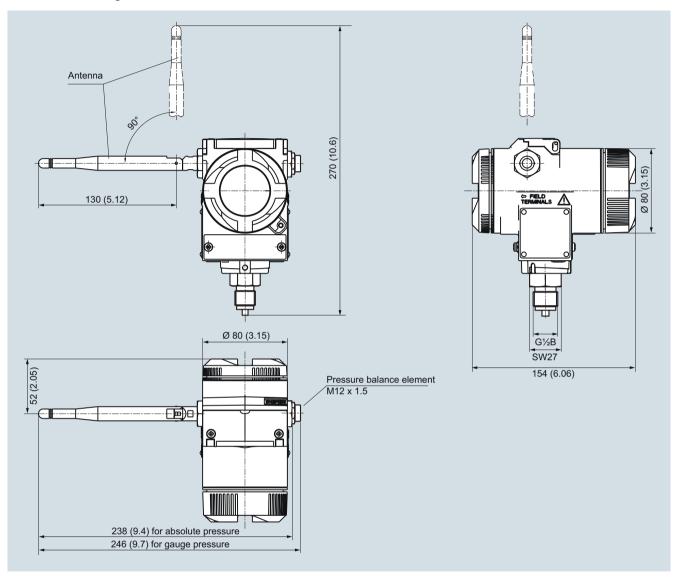
	A 11 1 NI
Selection and Ordering data SITRANS P280 WirelessHART	Article No.
SITRANS P280 WirelessHART pressure transmitter	
(Required battery not included with delivery, see accessories)	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measuring cell filling	
Dry measuring cell	0
Measuring span	
Gauge pressure	
0 1.6 bar (0 23 psi)	D
0 10 bar (0 145 psi) 0 50 bar (0 725 psi)	E F
0 200 bar (0 723 psi)	G
0 320 bar (0 4641 psi)	Ĥ
Absolute pressure	
0 1.6 bar a (0 3 psia)	M
0 10 bar a (0 145 psia)	N
0 50 bar a (0 725 psia) 0 200 bar a (0 2900 psia)	PQ
0 320 bar a (0 4641 psia)	R
Wetted parts	
Ceramic	к
Display	
Display, visible	1
Enclosure	
Die-cast aluminum	1
Process connection	
G½ as per EN 837-1 ½-14 NPT	0
Explosion protection	
Without	Α
Antenna	
Variable, attached to device	A
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Stainless steel tag plate (measuring point	Y15
description) max. 16 digits entered in plain text Y15:	
Measuring point message max. 27 characters entered in plain text: Y16:	Y16
Accessories	Article No.
Lithium battery for SITRANS TF280/P280	
Mounting bracket, steel	7MF4997-1AC
Mounting bracket, stainless steel	7MF4997-1AJ
Cover, die-cast aluminum, without window	7MF4997-1BB
Cover, die-cast aluminum, with window	7MF4997-1BE
IE/WSN-PA LINK	see Sec. 7
HART modem with USB interface	7MF4997-1DB
SIMATIC PDM	see Sec. 8
A 71.1.1	

Available ex stock

Transmitters with WirelessHART

# SITRANS P280 for gauge and absolute pressure

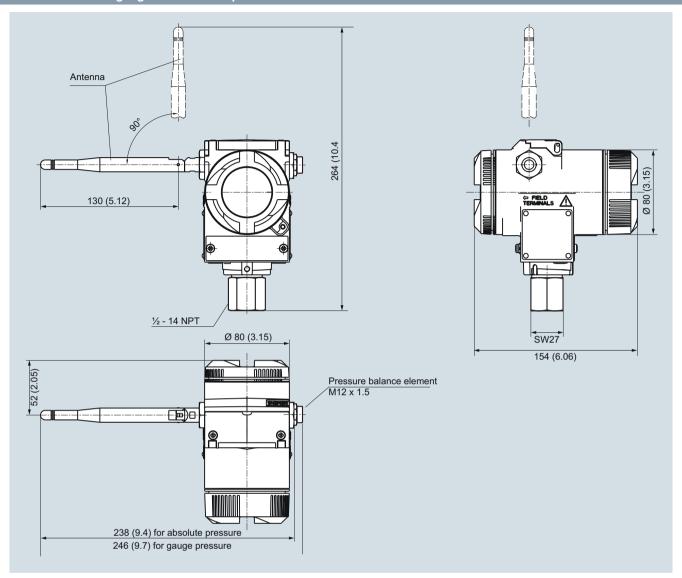
# Dimensional drawings



SITRANS P280 WirelessHART pressure transmitter, process connection  $G\frac{1}{2}$ , dimensions in mm (inch) The dimensional drawing of the mounting bracket see on page 1/192.

Transmitters with WirelessHART

### SITRANS P280 for gauge and absolute pressure



SITRANS P280 WirelessHART pressure transmitter, process connection  $\frac{1}{2}$  - 14 NPT, dimensions in mm (inch) The dimensional drawing of the mounting bracket see on page 1/192.

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

### Overview



The SITRANS P300 is a digital pressure transmitter for relative and absolute pressure. The conventional thread versions are available as process connections, as are flush-mounted versions. A large number of the flush-mounted versions are suitable for food and pharmaceutical applications, and satisfy the EHEDG and 3A hygiene requirements.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION signal, which is linearly proportional to the input pressure. Communication is via HART protocol or PROFIBUS PA interface. Convenient buttons for easy local operation of the basic settings of the pressure transmitter.

The SITRANS P300 has a single-chamber stainless steel casing. The pressure transmitter is approved with "intrinsically safe" type of protection. It can be used in zone 1 or zone 0.

### Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (such as stainless steel, Hastelloy)
- Measuring range 0.008 bar to 400 bar (0.1 psi to 5802 psi)
- · High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA or FOUNDATION Fieldbus

### Application

The pressure transmitter is available in versions for gauge pressure and for absolute pressure. The output signal is always a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbussignal, which is linearly proportional to the input pressure. The pressure transmitter measures aggressive, non-aggressive and hazardous gases, as well as vapors and liquids.

It can be used for the following measurement types:

- · Gauge pressure
- Absolute pressure

With appropriate parameter settings, it can also be used for the following additional measurement types:

- Level
- Volume
- Mass

The "intrinsically-safe" Ex version of the transmitter can be installed in hazardous areas (zone 1). The transmitters are provided with an EC type examination certificate and comply with the respective harmonized European standards of ATEX.

### Gauge pressure

This variant measures aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.01 bar (0.15 psi), the largest is 400 bar (5802 psi).

### Level

With appropriate parameter settings, the gauge pressure variant measures the level of aggressive, non-aggressive and hazardous liquids.

For measuring the level in an open container you require one device; for measuring the level in a closed container, you require two devices and a process control system.

### Absolute pressure

This variant measures the absolute pressure of aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.008 bar a (0.12 psia), the largest is 30 bar a (435 psia).

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### Design

The device comprises:

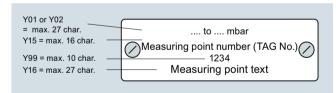
- Electronics
- Housing
- · Measuring cell



### Perspective view of SITRANS P300

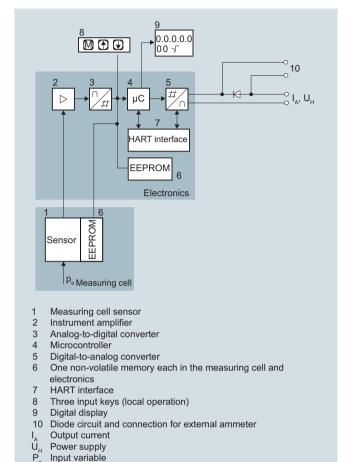
The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power  $U_{\rm H}$  and the shield are in the terminal housing. The cable gland is mounted on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

### Example of attached measuring points sign



### Function

### Operation of electronics with HART communication



### Function diagram of electronics

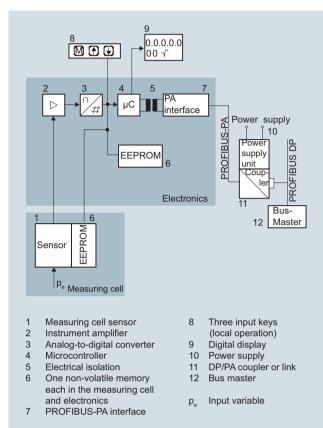
The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. In a digital-to-analog converter (5) it is then converted into the output current of 4 to 20 mA. A diode circuit provides reverse polarity protection. You can make an uninterrupted current measurement with a low-ohm ammeter at the connection (10). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, socalled modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer via the HART modem (7).

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

# Operation of electronics with PROFIBUS PA communication

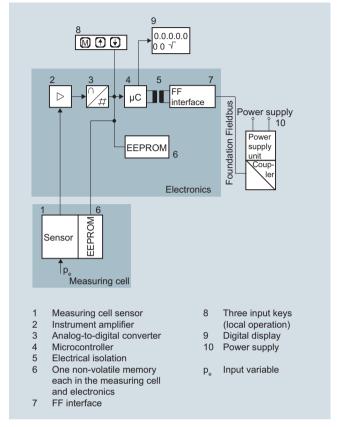


### Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. It is then made available at the PROFIBUS PA over an electrically isolated PROFIBUS PA interface (7). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, socalled modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings (12) can be changed with a computer over the bus master.

# Operation of electronics with FOUNDATION Fieldbus communication



### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

### Mode of operation of the measuring cells

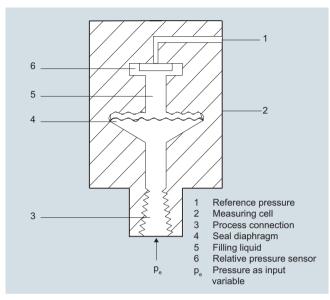
The process connections available include the following:

- G½
- ½-14 NPT
- Flush-mounted diaphragm:
  - Flanges to EN
  - Flanges to ASME
  - NuG and pharmaceutical connections

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### Measuring cell for gauge pressure

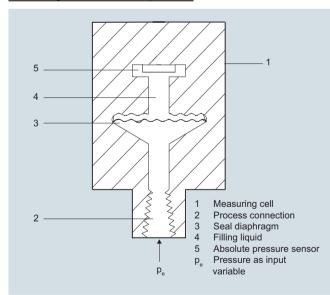


Measuring cell for gauge pressure, function diagram

The input pressure ( $p_e$ ) is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans  $\leq$  63 bar ( $\leq$  926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of  $\geq$  160 bar ( $\geq$  2352 psi) compared to a vacuum.

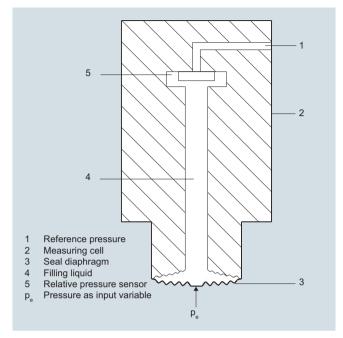
### Measuring cell for absolute pressure



Measuring cell for absolute pressure, function diagram

The input pressure  $(p_e)$  is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

### Measuring cell for gauge pressure, front-flush diaphragm

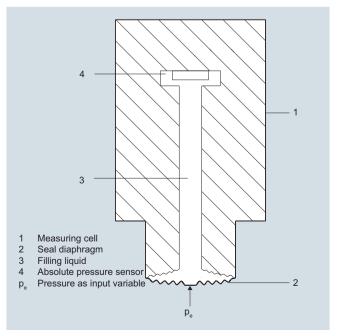


Measuring cell for gauge pressure, front-flush diaphragm, function diagram

The input pressure  $(p_e)$  is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans  $\leq$  63 bar ( $\leq$  926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of  $\geq$  160 bar ( $\geq$  2352 psi) compared to a vacuum.

Measuring cell for absolute pressure, front-flush diaphragm



Measuring cell for absolute pressure, front-flush diaphragm, function diagram

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

The input pressure ( $p_e$ ) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

### Parameterization

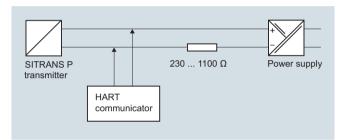
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

### Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

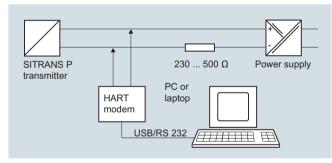
### Parameterization using HART communication

Parameterization using HART communication is performed with a HART communicator or a PC.



Communication between a HART communicator and a pressure transmitter

When parameterizing with the HART communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

# Adjustable parameters on SITRANS P300 with HART communication

Parameters	Input keys	HART communication
Start of scale	X	X
Full-scale value	X	X
Electrical damping	X	x
Start-of-scale value without application of a pressure ("Blind setting")	Х	Х
Full-scale value without application of a pressure ("Blind setting")	Х	Х
Zero adjustment	×	x
current transmitter	X	х
Fault current	X	х
Disabling of buttons, write protection	X	x <sup>1)</sup>
Type of dimension and actual dimension	X	X
Input of characteristic		X
Freely-programmable LCD		x
Diagnostic functions		x

<sup>1)</sup> Cancel apart from write protection

# Diagnostic functions for SITRANS P300 with HART communication

- Zero correction display
- Event counter
- Limit transmitter
- · Saturation alarm
- Slave pointer
- · Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART communication

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the SITRANS P300 PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

### Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the P300 is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

# Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	X	X
Zero adjustment (correction of position)	X	Х
Buttons and/or function disabling	X	X
Source of measured-value display	X	X
Physical dimension of display	X	X
Position of decimal point	X	X
Bus address	X	X
Adjustment of characteristic	X	X
Input of characteristic		X
Freely-programmable LCD		X
Diagnostic functions		X

# Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- · Event counter
- Slave pointer
- Maintenance timer
- · Simulation functions
- Display of zero correction
- · Limit transmitter
- Saturation alarm

### Physical dimensions available for the display

Physical variable	Physical dimensions		
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mmH $_2$ O, mmH $_2$ O (4 °C), inH $_2$ O, inH $_2$ O (4 °C), ftH $_2$ O (20 °C), mmHg inHg		
Level (height data)	m, cm, mm, ft, in, yd		
Mass	g, kg, t, lb, Ston, Lton, oz		
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid		
volume flow	m³/s, m³/min, m³/h, m³/d, l/s, l/min, l/h, l/ d, Ml/d, ft³/s, ft³/min, ft³/h, ft³/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d		
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d		
Total mass flow	t, kg, g, lb, oz, LTon, STon		
Temperature	K, °C, °F, °R		
Miscellaneous	%		

### Hygiene version

In the case of the SITRANS P300 with 7MF812.-... front-flush diaphragm, selected connections comply with the requirements of the EHEDG or 3A. You will find further details in the order form. Please note in particular that the seal materials used must comply with the requirements of 3A. Similarly, the filling liquids used must be FDA-compliant.

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### Technical specifications

### SITRANS P300 for gauge and absolute pressure

### Gauge pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)

	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
b	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	8.3 250 mbar	250 mbar	4 bar	6 bar
	0.83 25 kPa	25 kPa	400 kPa	600 kPa
	0.12 3.6 psi	3.6 psi	58 psi	87 psi
	0.01 1 bar	1 bar	4 bar	6 bar
	1 100 kPa	100 kPa	400 kPa	600 kPa
	0.15 14.5 psi	14.5 psi	58 psi	87 psi
	0.04 4 bar	4 bar	7 bar	10 bar
	4 400 kPa	400 kPa	0.7 MPa	1 MPa
	0.58 58 psi	58 psi	102 psi	145 psi
	0.16 16 bar	16 bar	21 bar	32 bar
	16 1600 kPa	1600 kPa	2.1 MPa	3.2 MPa
	2.3 232 psi	232 psi	305 psi	464 psi
	0.63 63 bar	63 bar	67 bar	100 bar
	63 6300 kPa	6300 kPa	6.7 MPa	10 MPa
	9.1 914 psi	914 psi	972 psi	1450 psi
	1.6 160 bar	160 bar	167 bar	250 bar
	0.16 16 MPa	16 MPa	16.7 MPa	2.5 MPa
	23 2321 psi	2321 psi	2422 psi	3626 psi
	4 400 bar	400 bar	400 bar	600 bar
	0.4 40 kPa	40 kPa	40 MPa	60 MPa
	58 5802 psi	5802 psi	5802 psi	8700 psi

### Lower measuring limit

(for 250mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.)

- Measuring cell with silicone oil
- Measuring cell with inert filling liquid

Upper measuring limit

30 mbar a/3 kPa a/0.44 psia

30 mbar a/3 kPa a/0.44 psia

100 % of max. span

(for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 ° (140 °F) ambient temperature/process temperature)

### Absolute pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Absolute pressure

Absolute pressure				
	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	8.3 250 mbar a	250 mbar a	1.5 bar a	6 bar a
	0.83 25 kPa a	25 kPa a	150 kPa a	600 kPa a
	3 100 inH <sub>2</sub> O a	100 inH <sub>2</sub> O a	21.8 psia	87 psia
	43 1300 mbar a	1300 mbar a	2.6 bar a	10 bar a
	4.3 130 kPa a	130 kPa a	260 kPa a	1 MPa a
	17 525 inH <sub>2</sub> O a	525 inH <sub>2</sub> O	37.7 psia	145 psia
	160 5000 mbar a	5000 mbar a	10 bar a	30 bar a
	16 500 kPa a	500 kPa a	1 MPa a	3 MPa a
	2.32 72.5 psia	72.5 psia	145 psia	435 psia
	1 30 bar a	30 bar a	45 bar a	100 bar a
	0.1 3 MPa a	3 MPa a	4.5 MPa a	10 MPa a
	14.5 435 psia	435 psia	653 psia	1450 psia

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure						
SITRANS P300 for gauge and absolute pressure						
Lower measuring limit						
Measuring cell with silicone oil	0 mbar a/0 kPa a /0	psia				
<ul> <li>Measuring cell with inert filling liquid</li> </ul>						
- for process temperature -20 °C < 9 $\leq$ +60 °C (-4 °F < 9 $\leq$ +140 °F)	30 mbar a/3 kPa a/0.44 psia					
- for process temperature 60 °C < $9 \le$ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < $9 \le$ +212 °C (max. 185 °C for meas. cell 435 psi))						
Upper measuring limit		100 % of max. span (for oxygen measurement max. 100 bar/10 MPa/1450 psi und 60 °C (108 °F) ambient temperature/process temperature)				
Start of scale value	Between the measur	ring limits (fully adjust	able)			
Input of gauge pressure, with front-flush diaphragm						
Measured variable	Gauge pressure, fro	nt-flush				
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus				
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure		
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi)		
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi		
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi		
	0.63 63 bar 63 6300 kPa 9.1 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi		
Lower measuring limit		1	!	1		
Measuring cell with silicone oil filling	100 mbar a/10 kPa/	1.45 psia				
<ul> <li>Measuring cell with inert filling liquid</li> </ul>	100 mbar a/10 kPa/	1.45 psia				
<ul> <li>Measuring cell with Neobee</li> </ul>	100 mbar a/10 kPa/	1.45 psia				
Upper measuring limit	100% of max. span					
Input of absolute pressure, with front-flush diaphragm						
Measured variable	Absolute pressure, f	1	1			
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART PROFIBUS PA/ FOUNDATION Fieldbus					
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure		
	43 1300 mbar a 4.3 130 kPa a 17 525 inH <sub>2</sub> O	1300 mbar a 130 kPa a 525 inH <sub>2</sub> O	2.6 bar a 260 kPa a 37.7 psi	10 bar a 1 MPa a 145 psi		
	160 5000 mbar a 16 500 kPa a 2.32 72.5 psia	5000 mbar a 500 kPa a 72.5 psia	10 bar a 1 MPa a 145 psia	30 bar a 3 MPa a 435 psia		
	1 30 bar a 0.1 3 MPa a 14.5 435 psia	30 bar a 3 MPa a 435 psia	45 bar a 4.5 MPa a 653 psia	100 bar a 10 MPa a 1450 psia		
	Depending on the p	rocess connection, th	e span may differ from	m these values		
Lower measuring limit	0 mbar a/0 kPa a/0 p	osia				
Upper measuring limit	100 % of max. span					
Output	HART			JNDATION Fieldbus		
Output signal	4 20 mA		Digital PROFIBUS PA	A or FOUNDATION		
Physical bus	- Drotootod amainst -	port pirouit and had all	IEC 61158-2			
Protection against polarity reversal		nort-circuit and polarit ainst the other with m				
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	3)	_			

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### SITRANS P300 for gauge and absolute pressure

### Measuring accuracy for gauge pressure

Reference conditions

Measuring span ratio r (spread, Turn-Down)

Error in measurement at limit setting incl. hysteresis and reproducibility

- · Linear characteristic
- 250 mbar/25 kPa/3.6 psi
- 1 bar/100 kPa/3.6 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi
- 400 bar/40 MPa/5802 psi

Influence of ambient temperature (in percent per 28 °C (50 °F))

- 250 mbar/25 kPa/3.6 psi
- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi

Long-term stability (temperature change ± 30 °C (± 54 °F))

- 250 mbar/25 kPa/3.6 psi
- 1 bar/100 kPa/3.6 psi 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi

Effect of mounting position

Effect of auxiliary power supply (in percent per change in voltage)

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

- According to IEC 60770-1 • Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Measuring cell with silicone oil
- Room temperature 25 °C (77 °F)

r = max. measuring span/set measuring span or nominal pressure range

r ≤ 1.25 : ≤ 0.065 %

 $1.25 < r \le 30$ :  $\leq$  (0.008 · r + 0.055) %

 $r \le 5$ : ≤ 0.065 %

 $5 < r \le 100$ :  $\leq$  (0.004 · r + 0.045) %

r ≤ 3 : ≤ 0.075 %

3 < r ≤ 10 :  $\leq$  (0.0029 · r + 0.071) %  $10 < r \le 100$ :  $\leq (0.005 \cdot r + 0.05) \%$ 

 $\leq$  (0.16 · r + 0.1) %

 $\leq$  (0.05 · r + 0.1) %

 $\leq$  (0.025 · r + 0.125) %

 $\leq$  (0.16 · r + 0.1) % per year

 $\leq$  (0.05 · r + 0.1) % in 5 years

 $\leq$  (0.025 · r + 0.125) % in 5 years

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination

(zero point correction is possible with position error compensation)

0.005 % per 1 V

3 · 10<sup>-5</sup> of the rated measuring range

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure			
Measuring accuracy for absolute pressure	According to IEC 60770-1		
Reference conditions	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Measuring cell with silicone oil</li> <li>Room temperature 25 °C (77 °F)</li> </ul>		
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring	span or nominal pressure range	
Error in measurement at limit setting incl. hysteresis and reproducibility			
Linear characteristic			
- r ≤ 10	≤ 0.1 %		
- 10 < r ≤ 30	≤ 0.2 %		
Influence of ambient temperature (in percent per 28 °C (50 °F))			
• 250 mbar/25 kPa/3.6 psi	$\leq$ (0.15 · r + 0.1) %		
<ul> <li>1300 mbar a/130 kPa a/18.8 psia</li> <li>5 bar /500 kPa a/72.5 psia</li> <li>30 bar /3000 kPa a/435 psia</li> </ul>	≤ (0.08 · r + 0.16) %		
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % in 5 years		
Effect of mounting position (in pressure per change in angle)	$\leq$ 0.05 mbar/0.005 kPa/0.000725 psi per (zero point correction is possible with po		
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V		
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of the rated measuring range		
Measuring accuracy for gauge and absolute pressure, with front-flush diaphragm	According to IEC 60770-1		
Reference conditions	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Measuring cell with silicone oil</li> <li>Room temperature 25 °C (77 °F)</li> </ul>		
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring	span or nom. pressure range	
Error in measurement at limit setting incl. hysteresis and reproducibility			
Linear characteristic	Gauge pressure, with front-flush	Absolute pressure, with front-flush	
- r≤5	diaphragm ≤ 0.075 %	diaphragm -	
- 1 ≤ 5 - 5 < r ≤ 100	$\leq 0.075\%$ $\leq (0.005 \cdot r + 0.05)\%$		
- r ≤ 10	_ (0.000 1 + 0.00) /6	≤ 0.2 %	
- 10 < r ≤ 30		≤ 0.4 %	
Influence of ambient temperature (as percentage per 28 °C (50 °F))	≤ (0.08 · r + 0.16) %	$\leq (0.16 \cdot r + 0.24) \%$	
Effect of process temperature (in pressure per temperature change)			
Temperature difference between process temperature and ambient temperature	3 mbar/0.3 kPa/0.04 psi per 10 K		
Long-term stability (temperature change ± 30 °C (± 54 °F))	(0.25 · r) % in 5 years		
Effect of mounting position (in pressure per change in angle)	0.4 mbar/0.04 kPa/0.006 per 10° inclinati (zero point correction is possible with po		
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V		
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	$3 \cdot 10^{-5}$ of the rated measuring range		

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure	
Rated conditions	
Installation conditions	
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.
Measuring cell with silicone oil	-40 +85 °C (-40 +185 °F)
<ul> <li>Measuring cell with Neobee oil (FDA-compliant, with flush- mounted diaphragm)</li> </ul>	-10 +85 °C (14 +185 °F)
Measuring cell with inert liquid (not with front-flush dia- phragm)	-20 +85 °C (-4 +185 °F)
Display readable	-30 +85 °C (-22 +185 °F)
Storage temperature	-50 +85 °C (-58 +185 °F) (for Neobee: -20 +85 °C (-4 +185 °F)) (for temperature oil: -10 + 85 °C (14 +165 °F))
Climatic class	
Condensation	Relative humidity 0 100 % Condensation permissible, suitable for use in the tropics
Degree of protection acc. to EN 60529	IP65, IP68, NEMA X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)
Electromagnetic Compatibility	
• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21
Medium conditions	
Temperature of medium	
Measuring cell with silicone oil	-40 +100 °C (-40 +212 °F)
<ul> <li>Measuring cell with silicone oil (FDA-compliant, with flush- mounted diaphragm)</li> </ul>	-40 +150 °C (-40 +302 °F)
<ul> <li>Measuring cell with Neobee oil "Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)</li> </ul>	-10 +150 °C (-14 +302 °F)
<ul> <li>Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted dia- phragm)</li> </ul>	-40 +200 °C (-40 +392 °F)
<ul> <li>Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)</li> </ul>	-10 +200 °C (14 +392 °F)
Measuring cell with inert liquid	-20 +100 °C (-4 +212 °F)
<ul> <li>Measuring cell with high-temperature oil (only for gauge pressure version with flush-mounted diaphragm)</li> </ul>	-10 +250 °C (14 482 °F)
Design (standard version)	
Weight (without options)	Approx. 800 g (1.8 lb)
Enclosure material	Stainless steel, mat. no. 1.4301/304
Material of parts in contact with the medium	
Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Oval flange	Stainless steel, mat. no. 1.4404/316L
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Measuring cell filling	Silicone oil     Inert filling liquid
Process connection	<ul> <li>G½B to EN 837-1</li> <li>Female thread ½-14 NPT</li> <li>Oval flange PN 160 (MAWP 2320 psi) with fastening thread:</li> <li>-<sup>7</sup>/<sub>16</sub> -20 UNF to IEC 61518</li> <li>M10 as per DIN 19213</li> </ul>

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure				
Design (version with front-flush diaphragm)				
Weight (without options)	approx. 1 13 kg (2.2 29 lb)			
Enclosure material	Stainless steel, mat. no. 1.4301/304			
Material of parts in contact with the medium • Process connection	Stainless steel, mat. no. 1.4404/316L			
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L			
Measuring cell filling	Silicone oil     Inert filling liquid     FDA compliant fill fluid (Neobee oil)			
Process connection	<ul><li>Flanges as per EN and ASME</li><li>F&amp;B and pharmaceutical flanges</li></ul>			
Surface quality touched-by-media	$R_a$ -values $\leq 0.8 \ \mu m (32 \ \mu\text{-inch})/welds R_a) \leq 1.6 \ \mu m (64 \ \mu\text{-inch})$			
	(Process connections acc. to 3A; $R_a$ -values $\leq$ 0.8 $\mu m$ (32 $\mu$ -inch)/welds $R_a \leq$ 0.8 $\mu m$ (32 $\mu$ -inch)			
Power supply U <sub>H</sub>	HART	PROFIBUS PA/FOUNDATION Fieldbus		
Power supply <i>U</i> <sub>H</sub> Terminal voltage on transmitter	HART  10.5 42 V DC for intrinsically safe operation: 10.5 30 V DC	PROFIBUS PA/FOUNDATION Fieldbus		
	10.5 42 V DC for intrinsically safe operation:	PROFIBUS PA/FOUNDATION Fieldbus  Supplied though bus		
Terminal voltage on transmitter	10.5 42 V DC for intrinsically safe operation:			
Terminal voltage on transmitter  Power supply	10.5 42 V DC for intrinsically safe operation:	Supplied though bus		
Terminal voltage on transmitter  Power supply Separate power supply	10.5 42 V DC for intrinsically safe operation:	Supplied though bus		
Terminal voltage on transmitter  Power supply Separate power supply Bus voltage	10.5 42 V DC for intrinsically safe operation:	Supplied though bus Not necessary		
Terminal voltage on transmitter  Power supply Separate power supply Bus voltage  • Without Ex	10.5 42 V DC for intrinsically safe operation:	Supplied though bus Not necessary 9 32 V		
Terminal voltage on transmitter  Power supply Separate power supply Bus voltage  • Without Ex  • With intrinsically-safe operation	10.5 42 V DC for intrinsically safe operation:	Supplied though bus Not necessary 9 32 V		
Terminal voltage on transmitter  Power supply Separate power supply Bus voltage  • Without Ex  • With intrinsically-safe operation Current consumption	10.5 42 V DC for intrinsically safe operation:	Supplied though bus Not necessary 9 32 V 9 24 V		
Terminal voltage on transmitter  Power supply Separate power supply Bus voltage  • Without Ex  • With intrinsically-safe operation Current consumption  • Max. basic current	10.5 42 V DC for intrinsically safe operation:	Supplied though bus Not necessary 9 32 V 9 24 V 12.5 mA		

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure					
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus			
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)				
Water, waste water	Pending				
Explosion protection					
Intrinsic safety "i"	PTB 05 ATEX 2048				
Marking	Ex II 1/2 G Ex ia/ib IIB/IIC T4, T5, T6				
Permissible ambient temperature					
- Temperature class T4	-40 +85 °C (-40 +185 °F)				
- Temperature class T5	-40 +70 °C (-40 +158 °F)				
- Temperature class T6	-40 +60 °C (-40 +140 °F)				
Connection	To certified intrinsically-safe circuits with peak values:	To certified intrinsically-safe circuits with peak values:			
	$U_i = 30 \text{ V}, I_i = 100 \text{ mA},$ $P_i = 750 \text{ mW}, R_i = 300 \Omega$	FISCO supply unit: $U_i = 17.5 \text{ V}, I_i = 380 \text{ mA}, P_i = 5.32 \text{ W}$			
		Linear barrier: $U_i = 24 \text{ V}, I_i = 250 \text{ mA}, P_i = 1.2 \text{ W}$			
Effective inner capacitance:	$C_i = 6 \text{ nF}$	$C_i = 1.1 \text{ nF}$			
Effective internal inductance:	$L_i = 0.4 \text{ mH}$	$L_i \le 7 \mu H$			
Explosion protection to FM for USA and Canada (cFM <sub>US</sub> )					
Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 T6; CL II, DIV T4 T6; CL I, DIV 2, GP ABCD T4 T6;	/ 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC CL II, DIV 2, GP FG; CL III			
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C  CL I, DIV 1, GP ABCD T4 T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 T6; CL I, DIV 2, GP ABCD T4 T6; CL II, DIV 2, GP FG; CL III				
Dust explosion protection for zone 20/21/22	PTB 05 ATEX 2048				
Marking	Ex II 1D Ex ia D 20 T 120 °C Ex II 2D Ex ib D 21 T 120 °C Ex II 3D Ex ib D 21 T 120 °C				
Permissible ambient temperature					
- Temperature class T4	-40 +85 °C (-40 +185 °F) (in the case of mineral glass windows only	-20 +85 °C (-4 +185 °F))			
- Temperature class T5	-40 +70 °C (-40 +158 °F) (in the case of mineral glass windows only	.20 +70 °C (-4 +158 °F))			
- Temperature class T6	-40 +60 °C (-40 +140 °F) (in the case of mineral glass windows only				
• Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 750 \text{ mW}$	To certified intrinsically-safe circuits with peak values:  U <sub>i</sub> = 24 V, I <sub>i</sub> = 380 mA, P <sub>i</sub> = 5.32 mW			
Effective inner capacitance:	$C_i = 6 \text{ nF}$	$C_i = 5 \text{ nF}$			
Effective internal inductance:	$L_{i} = 0.4 \mu H$	L <sub>i</sub> = 10 μH			
Type of protection Ex nA/nL/ic (Zone 2)	PTB 05 ATEX 2048				
• Marking	II 2/3 G Ex nA T4/T5/T6 II 2/3 G Ex nL IIB/IIC T4/T5/T6				
Permissible ambient temperature	,				
- Temperature class T4	-40 +85 °C (-40 +185 °F)				
- Temperature class T5	(in the case of mineral glass windows only -40 +70 °C (-40 +158 °F)	-20 +85 °C (-4 +185 °F))			
·	(in the case of mineral glass windows only	-20 +70 °C (-4 +158 °F))			
- Temperature class T6	-40 +60 °C (-40 +140 °F) (in the case of mineral glass windows only				
• Ex nA/nL connection	To certified intrinsically-safe circuits with peak values: $U_m = 45 \text{ V}$	To certified intrinsically-safe circuits with peak values: U <sub>m</sub> = 32 V			
• Ex ic connection	To certified intrinsically-safe circuits with peak values: $U_i = 45 \text{ V}$ To certified intrinsically-safe circuits with peak values: $U_i = 32 \text{ V}$				
Effective inner capacitance:	$C_i = 6 \text{ nF}$ $C_i = 5 \text{ nF}$				
Effective internal inductance:	$L_i = 0.4 \text{ mH}$	$L_i = 20 \mu H$			

### Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

HART Communication		FOUNDATION Fieldbu
HART communication	230 1100 Ω	Function blocks
Protocol	HART Version 5.x	FullClion blocks
Software for computer	SIMATIC PDM	<ul> <li>Analog input</li> </ul>
PROFIBUS PA communication Simultaneous communication with	4	<ul> <li>Adaptation to custo ic process variable</li> </ul>
master class 2 (max.)		- Electrical damping
The address can be set using	Configuration tool or local operation	- Simulation function
	(standard setting Address 126)	- Failure mode
Cyclic data usage		
Output byte	5 (one measured value) or	- Limit monitoring
	10 (two measured values)	- Littill Monitoring
• Input byte	0.1 or 2 (totalizer mode and reset function for dosing)	- Square-rooted cha
Internal preprocessing		for flow measureme
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	• PID
Function blocks	2	Physical block
Analog input		Transducer blocks
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer
- Electrical damping adjustable	0 100 s	- Can be calibrated
- Simulation function	Input /Output	two pressures
- Failure function	parameterizable (last good	<ul> <li>Monitoring of sense</li> </ul>
	value, substitute value, incorrect value)	- Simulation function pressure value, ser
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electroniture
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)	
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively	
Physical block	1	
Transducer blocks	2	
Pressure transducer block		
<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes	
- Monitoring of sensor limits	Yes	
- Specification of a container	Max. 30 nodes	

Constant value or over parame-

terizable ramp function

# ous

- tomer-specif-
- g, adjustable
- aracteristic ent

r block

- by applying
- or limits
- n: Measured ensor temper-nics tempera-

3 function blocks analog input, 1 function block PID

Yes, linearly rising or falling characteristic

0 ... 100 s

Output/input (can be locked within the device with a bridge)

parameterizable (last good value, substitute value, incorrect value)

Yes, one upper and lower warning limit and one alarm limit respectively

Yes

Standard FOUNDATION Fieldbus function block

1 resource block

1 transducer block Pressure with calibration, 1 transducer block LCD

Yes

Constant value or over parameterizable ramp function

characteristic with Simulation function for mea-

sor temperature

sured pressure value and sen-

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

Selection and Ordering		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure, single-chamber measuring housing, rating plate inscription in English		
4 20 mA/HART		7MF8023-
PROFIBUS PA		7MF8024-
	\ (EE)	
FOUNDATION Fieldbus	` ,	7 M F 8 0 2 5 -
tion in the PIA Life Cy		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
max. span (min max		
8.3 250 mbar	(0.12 3.63 psi)	A
0.01 1 bar	(0.145 14.5 psi)	B
0.04 4 bar	(0.58 58 psi)	C
0.1616 bar	(2.32 232 psi)	D
0.63 63 bar	(9.14 914 psi)	E
1.6 160 bar	(23.2 2320 psi)	F
4 400 bar	(58 5802 psi)	G
2.5 250 mbar a	, ,	Q
13 1300 mbar a	(0.04 3.63 psia) (0.19 18.86 psia)	S
0.05 5 bar a	(0.7 72.5 psia)	T
0.3 30 bar a	(4.35 435 psia)	Ů
Wetted parts materials Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	Α
Hastelloy	Stainless steel	В
Hastelloy	Hastelloy	C
Version for diaphragm s	eal <sup>1) 2) 3) 4) 5)</sup>	Y
Process connection		
• Connection shank G1/2	B to EN 837-1	0
<ul> <li>Female thread ½-14 N</li> </ul>		1
<ul> <li>Stainless steel oval fla</li> </ul>	nge with process connec-	
tion (Oval flange has r	no female thread) 6)	
- Mounting thread <sup>7</sup> / <sub>16</sub>		2
- Mounting thread M1		3
- Mounting thread M1		4
<ul> <li>Male thread M20 x 1.5</li> <li>Male thread ½ -14 NP</li> </ul>		5
		6
Non-wetted parts mate		
polished	drawn and electrolytically	4
Version • Standard versions		1
Explosion protection		
• None		A
<ul> <li>With ATEX, Type of pro</li> </ul>	otection:	
- "Intrinsic safety (Ex i		В
• Zone 20/21/22 <sup>7)</sup>	,	c
• Ex nA/nL (Zone 2) <sup>8)</sup>		Ē
• with FM "intrinsic safet	y" (cFM <sub>US</sub> )	М
Electrical connection /	cable entry	
<ul> <li>Screwed gland M20x1</li> </ul>		A
<ul> <li>Screwed gland M20x1</li> </ul>		В
<ul> <li>Screwed gland M20x1</li> </ul>	.5 (stainless steel)	C
<ul> <li>M12 connectors (meta</li> </ul>	al), without cable socket)	F
	less steel), without cable	G
<ul> <li>Screwed gland ½-14 i</li> </ul>		Н
<ul> <li>Screwed gland ½-14 i</li> </ul>	NPT stainless steel thread	J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure, single-chamber measuring housing, rating plate inscription in English	
4 20 mA/HART	7 M F 8 0 2 3 -
PROFIBUS PA	7 M F 8 0 2 4 -
FOUNDATION Fieldbus (FF)	7 M F 8 0 2 5 -
Without display, with keys, closed lid     With display and keys, closed lid	1 2
<ul> <li>With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)<sup>11)</sup></li> </ul>	4
<ul> <li>With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane<sup>11)</sup></li> </ul>	5
<ul> <li>With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS and FOUNDATION Fieldbus equip- ment: pressure units)<sup>11)</sup></li> </ul>	6
<ul> <li>With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane<sup>11)</sup></li> </ul>	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
  DVD with detailed documentation
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF802.-..Y..-... and 7MF4900-1...-.B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- $^{5)}$  Remote seal for direct mounting only available in combination with process connection 1/2 -14 NPT.
- 6) M10 fastening thread: Max. span 160 bar (2320 psi) 7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- 7) Only available together with electrical connection option A
- 8) Only available together with electrical connection options B, C or G.
- 9) Only together with HART electronics.
- <sup>10)</sup>Without cable gland.
- 11) Display cannot be turned.

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

Selection and Ordering	g data	Art	icle	No	).	
and absolute pressure	measuring housing, rating					
4 20 mA/HART		7 N	IF8	1 2	23	-
PROFIBUS PA		7MF8124-				-
FOUNDATION Fieldbus	s (FF)	7 N	IF 8	1 2	25	-
Click on the Article N tion in the PIA Life Cy	o. for the online configura- vcle Portal.	ľ	ľ		ľ	۳
Measuring cell filling Silicone oil Inert liquid	Measuring cell cleaning normal Cleanliness level 2 to DIN 25410 <sup>1)</sup>	1 3				
FDA compliant fill fluid • Neobee oil	normal	4				
max. span 0.01 1 bar 0.04 4 bar 0.16 16 bar 0.63 63 bar	(0.15 14.5 psi) (0.58 58 psi) (2.32 232 psi) (9.14 914 psi)	E C C	;			
13 1300 mbar a <sup>2)</sup> 0.05 5 bar a <sup>2)</sup> 0.03 30 bar a <sup>2)</sup>	(0.19 18.9 psia) <sup>2)</sup> (0.7 72.5 psia) <sup>2)</sup> (4.35 435 psia) <sup>2)</sup>	S T U				
Wetted parts materials Seal diaphragm	Measuring cell					
Stainless steel Hastelloy <sup>3)</sup>	Stainless steel Stainless steel		A B			
Process connection • Flange version with Or (see "Further designs"	der code M, N, R or Q		7			
Non-wetted parts mate • Stainless steel, deep-opolished	rials drawn and electrolytically			4		
Version • Standard versions					1	
Explosion protection  None	A ation.				,	4
<ul> <li>With ATEX, Type of pro-</li> <li>"Intrinsic safety (Ex is</li> </ul>						В
• Zone 20/21/22 <sup>4)</sup>	,					
• Ex nA/nL (Zone 2) <sup>5)</sup>						E
• with FM "intrinsic safet		_			,	И
Screwed gland M20x1 Screwed gland M20x1 Screwed gland M20x1 Screwed gland M20x1 M12 connectors (with)	.5 (polyamide) <sup>6)</sup> .5 (metal) .5 (stainless steel) but cable socket)					A B C F
socket)	less steel), without cable					G
<ul><li>Screwed gland ½-14 N</li><li>Screwed gland ½-14 N</li></ul>	NPT metal thread <sup>7)</sup> NPT stainless steel thread <sup>7)</sup>					H J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush mem- brane, single-chamber measuring housing, rating plate inscription in English	
4 20 mA/HART	7 M F 8 1 2 3 -
PROFIBUS PA	7 M F 8 1 2 4 -
FOUNDATION Fieldbus (FF)	7 M F 8 1 2 5 -
Display • Without display, with keys, closed lid	1
• With display and keys, closed lid <sup>8)</sup>	2
With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) <sup>8)</sup>	4
<ul> <li>With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane<sup>8)</sup></li> </ul>	5
With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) <sup>8)</sup>	6
<ul> <li>With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane<sup>8)</sup></li> </ul>	7

Power supply units see Chap. 7 "Supplementary Components"

Included in delivery of the device:

- Brief instruction (Leporello)
  DVD with detailed documentation
- 1) Not suitable for oxygen applications.
- 2) Not with temperature decoupler P00 and P10, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
- $^{3)}\,$  Only available for flanges with options M.., N.. and Q..
- 4) Only together with electrical connection option A.
- <sup>5)</sup> Only available together with electrical connection options B, C or G.
- 6) Only together with HART electronics.
- 7) Without cable gland.
- 8) Display cannot be turned.

Transmitters for food, pharmaceuticals and biotechnology

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and				
specify Order code.				
Pressure transmitter with mounting	A02	1	<b>✓</b>	1
bracket (2 shackles, 4 nuts, 4 U-plates,				
1 angle) made of:				
made completely of stainless steel, for wall	or			
pipe mounting				
Cable socket for M12 plug				
Stainless steel	A51		✓	✓
Rating plate inscription				
(instead of English)				
German	B10	✓	✓	✓
• French	B12	✓	✓	✓
Spanish	B13	✓	✓	✓
Italian	B14	✓	✓	✓
English rating plate	B21	✓	1	✓
Pressure units in inH <sub>2</sub> 0 and/or psi				
Quality inspection certificate (Five-step	C11	1	1	1
factory calibration) to IEC 60770-2 <sup>1)</sup>	311		·	·
Inspection certificate <sup>2)</sup>	C12	1	1	1
Acc. to EN 10204-3.1	012		•	•
Factory certificate	C14	✓	✓	✓
Acc. to EN 10204-2.2				
Degree of protection IP65/IP68	D12	✓	✓	✓
(only for M20x1.5 and ½-14 NPT)				
Degree of protection IP6k9k	D46	✓	✓	✓
(only for M20x1.5)				
Export approval Korea	E11	✓	✓	✓
Ex Approval Ex ia/ib NEPSI	E55	1	1	1
		·		-
Only for SITRANS P300 with front-flush diaphragm (7MF81)				
Flange to EN 1092-1, Form B1  ■ DN 25, PN 40 <sup>3)</sup>	M11		1	./
• DN 25, PN 100 <sup>4</sup> )	M21	<b>V</b>	<b>*</b>	<b>*</b>
• DN 40, PN 40	M13	1	1	· /
• DN 40, PN 100	M23	1	1	1
• DN 50, PN 16	M04	1	1	1
• DN 50, PN 40	M14	1	1	1
• DN 80, PN 16	M06	1	1	1
• DN 80, PN 40	M16	1	1	1
Flanges to ASME B16.5  • 1", class 150 <sup>4)</sup>	N40	1	1	./
• 1', class 150'' • 1½", class 150	M40 M41	<b>✓</b>	1	✓
• 1/2 , class 150 • 2", class 150	M42	<b>✓</b>	<b>∨</b>	<b>√</b>
• 2 , class 150 • 3". class 150	M43	1	<b>∀</b>	<b>√</b>
• 4", class 150	M44	<b>V</b>	<b>V</b>	<b>V</b>
• 1", class 300 <sup>4)</sup>	M45	1	1	<b>*</b>
• 1½", class 300	M46	1	<b>*</b>	·
• 2", class 300	M47	1	1	/
• 3", class 300	M48	1	1	/
• 4", class 300	M49	1	1	1
Threaded connector to DIN 3852-2, form thread to ISO 228	А,			
• G ¾"-A, front-flush <sup>4)</sup>	R01	1	1	1
• G 1"-A, front-flush <sup>4)</sup>	R02	1	1	1
• G 2"-A, front-flush <sup>4)</sup>	R04	1	1	1
Tank connection <sup>5)</sup>	.10-7			
IAIIK CONNECTION"				
Sealing is included in delivery	D40	.1	1	
	R10 R11	<b>*</b>	1	1

SITRANS P300 for gauge a	nd abs	olute	pres	sure
Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut) Certified to 3A <sup>6)</sup> • DN 50, PN 25	N04	<b>✓</b>	<i>4</i>	<b>√</b>
DN 80, PN 25  Tri-Clamp connection according DIN 32676/ISO 2852 Certified to 3A <sup>6)</sup>	N06	<b>✓</b>	✓	✓
• DN 50/2", PN 16 • DN 65/3", PN 10 Varivent connection	N14 N15	<b>*</b>	<b>√</b>	<b>√</b>
Certified to 3A and EHEDG <sup>6)</sup> • Type N = 68 for Varivent housing DN 40 125 and 1½" 6", PN 40	N28	✓	✓	✓
Temperature decoupler up to 200 °C <sup>7)</sup> for front-flush diaphragm version	P00	✓	✓	✓
Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil (Silicone oil)	P10	✓	✓	✓
Bio-Control sanitary process connection Certified to 3A and EHEDG <sup>6)</sup> • DN 50, PN 16	Q53	<b>√</b>	<b>.</b>	<b>√</b>
• DN 65, PN 16	Q54	✓	<b>'</b>	<b>'</b>
• DN 50, PN 40	M32	✓	✓	✓
SMS socket with union nut • 2"	M67	✓	✓	✓
• 2½" • 3"	M68 M69	<b>✓</b>	<b>√</b>	<b>√</b>
SMS threaded socket • 2"	M73	✓	✓	1
• 2½" • 3"	M74 M75	<b>√</b>	<b>√</b>	<b>√</b>
IDF socket with union nut ISO 2853 • 2"	M82	1	✓	✓
• 2½" • 3"	M83 M84	<b>√</b>	<b>√</b>	<b>√</b>
IDF threaded socket ISO 2853 • 2"	M92	✓	✓	<b>✓</b>
• 2½" • 3"	M93 M94	<b>√</b>	<b>√</b>	<b>✓</b>
Sanitary process connection to NEUMO Bio-Connect screw connection Certified to 3A and EHEDG <sup>6)</sup>				
<ul><li>DN 50, PN 16</li><li>DN 65, PN 16</li></ul>	Q05 Q06	<b>√</b>	1	1
<ul><li>DN 80, PN 16</li><li>DN 100, PN 16</li></ul>	Q07 Q08	<b>√</b>	1	<b>√</b>
• DN 2", PN 16 • DN 2½", PN 16	Q13 Q14	<b>√</b>	<b>√</b>	<b>√</b>
• DN 3", PN 16 • DN 4", PN 16	Q15 Q16	√ √	√ √	√ √
Sanitary process connection to NEUMO Bio-Connect flange connection Certified to 3A and EHEDG <sup>6)</sup>				
<ul><li>DN 50, PN 16</li><li>DN 65, PN 16</li></ul>	Q23 Q24	<b>√</b>	1	1
• DN 80, PN 16	Q25	1	√ √	<b>√</b> ✓
<ul><li>DN 100, PN 16</li><li>DN 2", PN 16</li></ul>	Q26 Q31	✓	✓	1
<ul><li>DN 2½", PN 16</li><li>DN 3", PN 16</li></ul>	Q32 Q33	<b>√</b>	1	1
• DN 4", PN 16	Q34	✓	✓	✓

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Sanitary process connection to NEUMO				
<b>Bio-Connect clamp connection</b> Certified to 3A and EHEDG <sup>6)</sup>				
• DN 50, PN 16	Q39	1	1	1
• DN 65, PN 10	Q40	1	✓	1
• DN 80, PN10	Q41	✓	✓	✓
• DN 100, PN 10	Q42	1	✓	✓
• DN 21/2", PN 16	Q48		✓	✓
• DN 3", PN 10	Q49	✓.	✓	✓
• DN 4", PN 10	Q50	<b>✓</b>	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection Certified to 3A and EHEDG				
• DN 2", PN 16	Q72	1	1	1
Aseptic threaded socket to DIN 11864-1 Form A	<u> </u>			
Certified to 3A and EHEDG				
• DN 50, PN 25	N33	✓	1	1
• DN 65, PN 25	N34	1	1	1
• DN 80, PN 25	N35	✓	✓	✓
• DN 100, PN 25	N36	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A				
Certified to 3A and EHEDG				
• DN 50, PN 16	N43	✓	✓	✓
• DN 65, PN 16	N44	✓.	<b>V</b>	<b>/</b>
• DN 80, PN 16	N45	1	1	<b>V</b>
• DN 100, PN 16	N46	•	✓	✓
Aseptic flange with groove to DIN 11864-2 Form A				
Certified to 3A and EHEDG				
• DN 50, PN 16	N43 +	✓	✓	✓
• DN 65, PN 16	P11 N44 +	1	✓	1
• DN 80, PN 16	P11 N45 +	1	1	1
• DN 100, PN 16	P11 N46 +	1	_	1
5 DN 100, 11V 10	P11	Ť	•	·
Aseptic clamp with groove to DIN 11864-3				
Certified to 3A and EHEDG				
• DN 50, PN 25	N53	✓	1	1
• DN 65, PN 25	N54	✓	✓	✓
• DN 80, PN 16	N55	✓	✓	✓
• DN 100, PN 16	N56	✓	✓	✓

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set	Y01	✓	<b>√</b> 8)	
Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi				
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)	Y16	✓	✓	✓
Max. 27 characters, specify in plain text: Y16:				
Entry of HART TAG	Y17	✓		
Max. 8 characters, specify in plain text: Y17:				
Setting of the display in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note: The following pressure units can be selected:	Y21	✓	✓	✓
bar, mbar, mm H <sub>2</sub> O <sup>*)</sup> , inH <sub>2</sub> O <sup>*)</sup> , ftH <sub>2</sub> O <sup>*)</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C				
Setting of the display in non- pressure units <sup>9)</sup>	Y22 +	✓		
Specify in plain text: Y22: up to I, m <sup>3</sup> , m, USg, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y01			
Preset bus address (possible between 1 126) Specify in plain text: Y25:	Y25		✓	✓
Factory mounting of valve manifolds, see acc	ooorio			

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22 and Y25 can be factory preset

✓ = available

### Ordering example

Item line: 7MF8023-1DB24-1AB7-Z

B line: A02 + Y01 + Y21

C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)

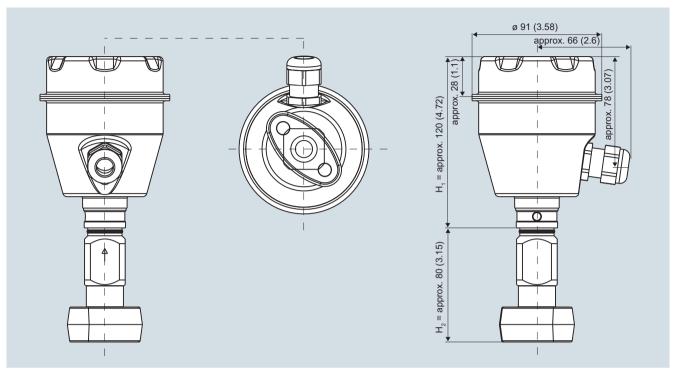
C line: Y21: bar (psi)

- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Special seal in Viton included in the scope of delivery
- 4) Cannot be combined with Order codes P00 and P10. Can only be ordered with silicone oil measuring cell filling.
- 5) The weldable socket can be ordered under accessories.
- 6) 3A certification only if used in conjunction with 3A-compliant sealing rings.
- 7) Certified to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).
- 8) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
- <sup>9)</sup> Preset values can only be changed over SIMATIC PDM.

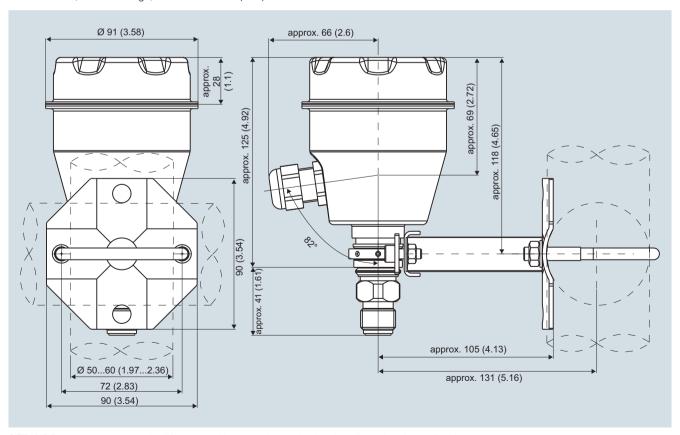
Transmitters for food, pharmaceuticals and biotechnology

# SITRANS P300 for gauge and absolute pressure

### Dimensional drawings



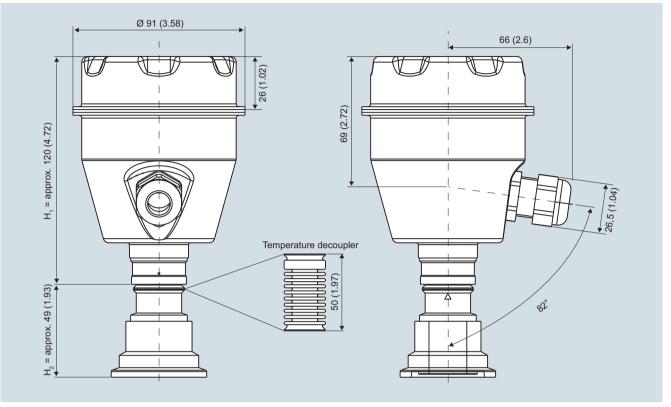
SITRANS P300, with oval flange, dimensions in mm (inch)



SITRANS P300, process connection M20 x 1.5, with mounted mounting bracket, dimensions in mm (inch)

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure



SITRANS P300, front-flush, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into  $H_1$  and  $H_2$ .

H<sub>1</sub> = Height of the SITRANS P300 up to a defined cross-section

 $H_2$  = Height of the flange up to this defined cross-section

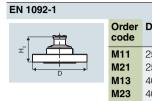
Only the height  $H_2$  is indicated in the dimensions of the flanges.

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

### Flanges as per EN and ASME

### Flange to EN



Order code	DN	PN	ØD	H <sub>2</sub>
M11	25	40	115 mm (4.5")	Approx.
M21	25	100	140 mm (5.5")	52 mm (2")
M13	40	40	150 mm (5.9")	
M23	40	100	170 mm (6.7")	
M04	50	16	165 mm (6.5")	
M14	50	40	165 mm (6.5")	
M06	80	16	200 mm (7.9")	
M16	80	40	200 mm (7.9")	

### Flanges to ASME

### **ASME B16.5**



Order code	DN	PN	ØD	H <sub>2</sub>
M40	1"	150	110 mm (4.3")	Approx.
M41	1½"	150	130 mm (5.1")	52 mm (2")
M42	2"	150	150 mm (5.9")	
M43	3"	150	190 mm (7.5")	
M44	4"	150	230 mm (9.1")	
M45	1"	300	125 mm (4.9")	
M46	1½"	300	155 mm (6.1")	
M47	2"	300	165 mm (6.5")	
M48	3"	300	210 mm (8.1")	
M49	4"	300	255 mm (10.0")	

### NuG and pharmaceutical connections

### Connections to DIN



union with slotted union nut)							
Order code	DN	PN	ØD	H <sub>2</sub>			
N04 N06	50 80	25 25	92 mm (3.6") 127 mm (5.0")	Approx. 52 mm (2")			

# Tri-Clamp nach DIN 3

32676					
	Order code	DN	PN	ØD	H <sub>2</sub>
	N14 N15	50 65	16 10	64 mm (2.5") 91 mm (3.6")	Approx. 52 mm (2")

### Other connections

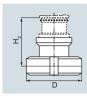
Varivent connection
T. D

Order code	DN	PN	ØD	H <sub>2</sub>
N28	40 125	40	84 mm (3.3")	Approx. 52 mm (2")

# Sanitary process con

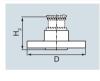
r	nnection to DRD							
	Order code	DN	PN	ØD	H <sub>2</sub>			
	M32	50	40	105 mm (4.1")	Approx. 52 mm (2")			

# Sanitary process screw connection to NEUMO Bio-Connect



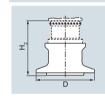
code	DN	PN	שש	п <sub>2</sub>
Q05	50	16	82 mm (3.2")	Approx.
Q06	65	16	105 mm (4.1")	52 mm (2")
Q07	80	16	115 mm (4.5")	
Q08	100	16	145 mm (5.7")	
Q13	2"	16	82 mm (3.2")	
Q14	21/2"	16	105 mm (4.1")	
Q15	3"	16	105 mm (4.1")	
Q16	4"	16	145 mm (5.7")	

# Sanitary process connection to NEUMO Bio-Connect flange connection



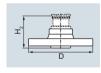
Order code	DN	PN	ØD	H <sub>2</sub>
Q23	50	16	110 mm (4.3")	Approx.
Q24	65	16	140 mm (5.5")	52 mm (2")
Q25	80	16	150 mm (5.9")	
Q26	100	16	175 mm (6.9")	
Q31	2"	16	100 mm (3.9")	
Q32	21/2"	16	110 mm (4.3")	
Q33	3"	16	140 mm (5.5")	
Q34	4"	16	175 mm (6.9")	

# Sanitary process connection to NEUMO Bio-Connect clamp connection



Order code	DN	PN	ØD	H <sub>2</sub>
Q39	50	16	77.4 mm (3.0")	Approx.
Q40	65	10	90.9 mm (3.6")	52 mm (2")
Q41	80	10	106 mm (4.2")	
Q42	100	10	119 mm (4.7")	
Q47	2"	16	77.4 mm (3.0")	
Q48	21/2"	16	90.9 mm (3.6")	
Q49	3"	10	106 mm (4.2")	
Q50	4"	10	119 mm (4.7")	

# Sanitary process connection to NEUMO Bio-Connect S flange connection



Order code	DN PN		ØD	H <sub>2</sub>	
Q72	2"	16	125 mm (4.9")	Approx. 52 mm (2")	

### Threaded connection G¾", G1" and G2" acc. to DIN 3852

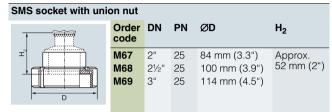


Ī	Order code	DN	PN	ØD	H <sub>2</sub>
	R01	3/4"	60	37 mm (1.5")	Approx. 45 mm (1.8")
	R02	1"	60	48 mm (1.9")	Approx. 47 mm (1.9")
	R04	2"	60	78 mm (3.1")	Approx. 52 mm (2")

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 for gauge and absolute pressure

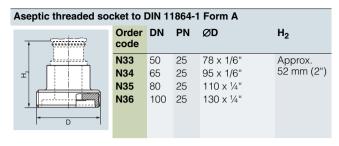
### Tank connection TG 52/50 and TG52/150 Order DN PN Η2 code R10 25 40 63 mm (2.5") Approx. 63 mm (2.5")Approx. 170 mm R11 25 40 63 mm (2.5") (6.7")



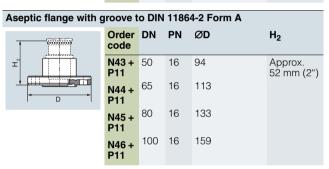
SMS threaded socket						
<b>—————————————————————————————————————</b>	Order code	DN	PN	ØD	H <sub>2</sub>	
T D	M73 M74 M75	2½"	25	70 x 1/6 mm 85 x 1/6 mm 98 x 1/6 mm	Approx. 52 mm (2")	

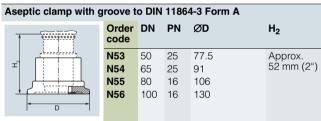
IDF socket with union nut							
	Order code	DN	PN	ØD	H <sub>2</sub>		
<b>1</b>	M82	2"	25	77 mm (3")	Approx.		
N	M83	21/2"	25	91 mm (3.6")	52 mm (2")		
D	M84	3"	25	106 mm (4.2")			





Aseptic flange with notch to DIN 11864-2 Form A						
	Order code	DN	PN	ØD	H <sub>2</sub>	
<b>1</b>	N43	50	16	94	Approx. 52 mm (2")	
	N44	65	16	113	52 mm (2")	
	N45	80	16	133		
l D l	N46	100	16	159		





Transmitters for food, pharmaceuticals and biotechnology

# SITRANS P300 Accessories/Spare parts

Selection and Ordering data	Article No.
Spare parts / Accessories	
Mounting bracket and fastening parts kit made of stainless steel	7MF8997-1AA
Lid without window gasket not included	7MF8997-1BA
<b>Lid with glass window</b> gasket not included	7MF8997-1BD
NBR enclosure sealing	7MF8997-1BG
Measuring point label unlabeled	7MF8997-1CA
Cable gland • metal • plastic (blue)	7MF8997-1EA 7MF8997-1EB
Weldable sockets for PMC connection • PMC Style Standard: Thread 1½" • PMC Style Minibolt: front-flush 1"	7MF4997-2HA 7MF4997-2HB
Gaskets for PMC connection (packing unit = 5 units)  PTFE seal for PMC Style Standard: Thread 1½"  Gasket made of Viton for PMC Style Minibolt: front-flush 1"	7MF4997-2HC 7MF4997-2HD
Weldable socket for TG 52/50 and TG 52/150 connection  TG 52/50 connection  TG5 2/150 connection	7MF4997-2HE 7MF4997-2HF
Seals for TG 52/50 and TG 52/150 made of silicone	7MF4997-2HG
Seals for flange connection with front-flush diaphragm Material FPM (Viton), 10 units  DN 25, PN 40 (M11)  DN 25, PN 100 (M21)  1", class 150 (M40)  1", class 300 (M45)	7MF4997-2HH 7MF4997-2HJ 7MF4997-2HK 7MF4997-2HL

Selection and Ordering data	Article No.
Operating Instructions <sup>1)</sup>	
<ul> <li>for SITRANS P300 series with HART</li> <li>German</li> <li>English</li> <li>French</li> <li>Spanish</li> <li>Italian</li> <li>Leporello German/English</li> <li>for SITRANS P300 series with PROFIBUS PA</li> </ul>	A5E00359580 A5E00359579 A5E00359578 A5E00359576 A5E00359577 A5E00359581
<ul> <li>German</li> <li>English</li> <li>French</li> <li>Spanish</li> <li>Italian</li> <li>Leporello German/English</li> </ul> Compact operating instructions	A5E00414587 A5E00414588 A5E00414589 A5E00414590 A5E00414591 A5E00414592
English, German, Spanish, French, Italian, dutch	A5E03434626
<ul> <li>English, Estonian, Latvian, Lithuanian, Polish, Romanian</li> </ul>	A5E03434631
<ul> <li>English, Bulgarian, Czech, Finnish, Slovakian, Slovenian</li> </ul>	A5E03434645
<ul> <li>English, Danish, Greek, Portuguese, Swedish, Hungarian</li> </ul>	A5E03434656
Korean	A5E03693760
The compact operating instructions are available in 21 EU languages on the product DVD supplied with each transmitter. They can also be downloaded from the SITRANS P web page.	
Brief instructions (Leporello)	
<ul><li>for SITRANS P300 with HART</li><li>German/English</li></ul>	A5E00359581
for SITRANS P300 with PROFIBUS PA     German/English	A5E00414592
• for SITRANS P300 with FOUNDATION Field-	7.0200 11 1002
bus - German/English	A5E01176733
DVD with SITRANS P documentation	
<ul> <li>German, English, French, Spanish, Italian including compact operating instructions in 21 EU languages</li> </ul>	A5E00090345
Certificates (order only via SAP) instead of Internet download	
• hard copy (to order)	A5E03252406
• on DVD (to order)	A5E03252407
HART modem	
with USB interface	7MF4997-1DB

Available ex stock

Power supply units see Chap. 7 "Supplementary Components".

<sup>1)</sup> You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

Transmitters for food, pharmaceuticals and biotechnology

### SITRANS P300 - Factory-mounting of valve manifolds on transmitters

### Overview

The SITRANS P300 transmitter for gauge and absolute pressure can be delivered factory-fitted with the following valve manifolds:

 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters

### Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

### Selection and Ordering data

# 7MF9011-4FA valve manifold on gauge and absolute pressure transmitters



Add <b>-Z</b> to the Article No. of the transmitter and add Order codes	Order code
SITRANS P300 7MF8021	T03
With process connection female thread ½-14 NPT in-sealed with PTFE sealing tape	
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12

# 7MF9011-4EA valve manifold on gauge and absolute pressure transmitters



Add -Z to the Article No. of the transmitter and add Order codes	Order code
SITRANS P300 7MF8020	T02
with process connection collar G½ A to EN 837-1 with gasket made of PTFE between valve manifold and transmitter	
Alternative sealing material:	
• Soft iron	A70
• Stainless steel, Mat. No. 14571	A71
• copper	A72
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12

Transmitters for food, pharmaceuticals and biotechnology

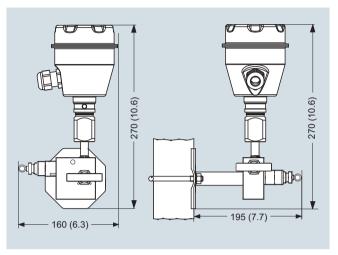
### SITRANS P300 - Factory-mounting of valve manifolds on transmitters

### Dimensional drawings

### Valve manifolds mounted on SITRANS P300



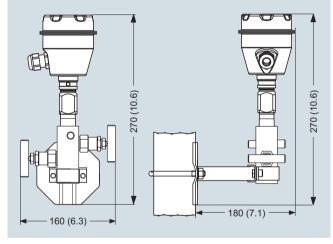
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



 $7\mbox{MF}9011\mbox{-}4\mbox{FA}$  valve manifold with mounted gauge pressure and absolute pressure transmitters



7 MF 9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

Transmitters for gauge pressure for the paper industry

SITRANS P DS III and P300 with PMC connection - Technical description

### Overview



The SITRANS P300 and DS III pressure transmitters have been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 and DS III transmitters can be used for all processes in the paper industry.

SITRANS P300 and SITRANS PDS III series pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Mass level
- Volume level

### Benefits

- · High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion.
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- · Minimum conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for SITRANS P300 with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for SITRANS P300 with PROFIBUS PA interface
- · High measuring accuracy
- Parameterization over control keys and HART Communication, or over PROFIBUS PA or FOUNDATION Fieldbus interface (DS III only).

### Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 control keys or programmed externally over HART or over PROFIBUS-PA or FOUNDATION Fieldbus interface (only DS III).

### SITRANS P. DS III series

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

### Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

### Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus: 1 ... 16 bar (14.5 ... 232 psi)

### SITRANS P300

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

### Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus: 1 ... 16 bar (14.5 ... 232 psi)

Transmitters for gauge pressure for the paper industry

#### SITRANS P DS III and P300 with PMC connection - Technical description

### Design

#### SITRANS P DS III



Device front view, SITRANS P DS III

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Device front view) with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

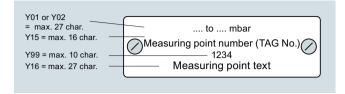
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover is screwed on at the front and rear of the housing. The front cover (2) can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

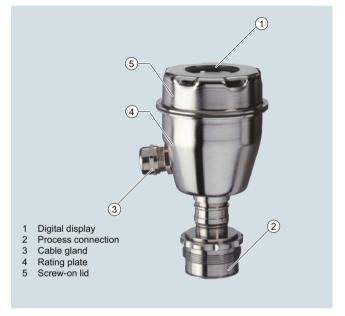
#### Example for an attached measuring point label



#### SITRANS P300

The device comprises:

- Electronics
- Housing
- Measuring cell



Perspective view of the SITRANS P300

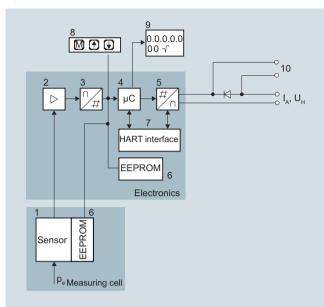
The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power UH and the shield are in the terminal housing. The cable gland is on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Transmitters for gauge pressure for the paper industry

SITRANS P DS III and P300 with PMC connection - Technical description

#### Function

#### Operation of electronics with HART communication



- 1 Measuring cell sensor
- 2 Instrument amplifier
- 3 Analog-to-digital converter
- 4 Microcontroller
- 5 Digital-to-analog converter
- 6 One non-volatile memory each in the measuring cell and electronics
- 7 HART interface
- 8 Three input keys (local operation)
- 9 Digital display
- 10 Diode circuit and connection for external ammeter
- I Output current
- U<sub>H</sub> Power supply
- P Input variable

#### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

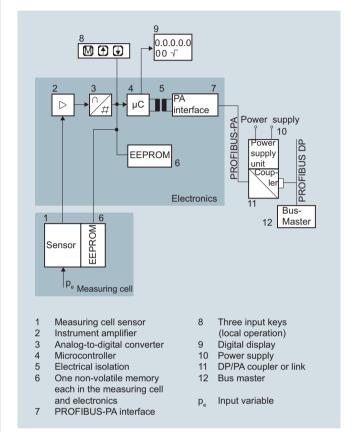
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans  $\leq$  63 bar (914 psi) measure the input pressure compared to atmosphere, the transmitters with spans 160 bar (2320 psi) measure compared to vacuum.

# Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier(2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The first memory is linked with the measuring cell, the second with the electronics. This modular design means that the electronics and the measuring cell can be replaced separately from one another.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

Transmitters for gauge pressure for the paper industry

#### SITRANS P DS III and P300 with PMC connection - Technical description

# Operation of electronics with FOUNDATION Fieldbus communication

#### 0.0.0.0.0 M 🕁 00 7 Foundation Fieldbus Power supply Powe EEPROM supply **Flectronics** Sensor Tp. Measuring cell Measuring cell sensor Three input keys 2 Instrument amplifier (local operation) Analog-to-digital converter 9 3 Digital display 4 Microcontroller 10 Power supply 5 Electrical isolation One non-volatile memory Input variable each in the measuring cell and electronics FF interface

### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

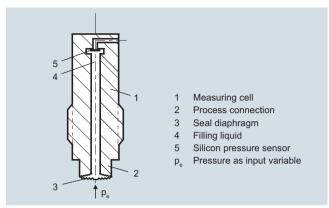
Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the

FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

#### Mode of operation of the measuring cell

Measuring cell for gauge pressure with front-flush diaphragm



Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure  $p_{\rm e}$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

#### **Parameterization**

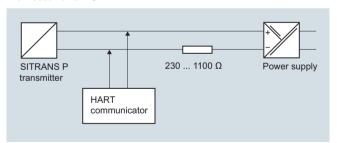
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

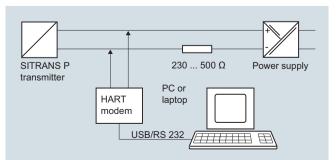
With the input buttons you can easily set the most important parameters without any additional equipment.

#### Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

Transmitters for gauge pressure for the paper industry

#### SITRANS P DS III and P300 with PMC connection - Technical description

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameter DS III with HART and P300 with HART

rajuetable parameter be in with	<i>,,</i> ,, ,, , ,, ,, ,, ,, ,, ,, ,, ,, ,, ,	70 11111111111
Parameters	Input keys	HART communication
Start of scale	X	X
Full-scale value	×	x
Electrical damping	x	X
Start-of-scale value without application of a pressure ("Blind setting")	X	X
Full-scale value without application of a pressure ("Blind setting")	X	X
Zero adjustment	x	X
current transmitter	x	X
Fault current	×	X
Disabling of buttons, write protection	X	x <sup>1)</sup>
Type of dimension and actual dimension	×	X
Characteristic (linear)	×	x
Input of characteristic		X
Freely-programmable LCD		x
Diagnostic functions		X

<sup>1)</sup> Cancel apart from write protection

#### Diagnostic functions for DS III with HART and P300 with HART

- Zero correction display
- Event counter
- · Limit transmitter
- · Saturation alarm
- · Slave pointer
- · Simulation functions
- Maintenance timer

Available physical units of display for DS III with HART and P300 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, $g/cm^2$ , $kg/cm^2$ , $inH_2O$ , $inH_2O$ (4 °C), $mmH_2O$ , $ftH_2O$ (20 °C), $inHg$ , $mmHg$
Level (height data)	m, cm, mm, ft, in
Volume	m³, dm³, hl, yd³, ft³, in³, US gallon, lmp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

#### Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the DS III PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

#### Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDA- TION Fieldbus interface
Electrical damping	X	X
Zero adjustment (correction of position)	X	Х
Buttons and/or function disabling	X	X
Source of measured-value display	X	X
Physical dimension of display	X	X
Position of decimal point	X	X
Bus address	X	X
Adjustment of characteristic	X	X
Input of characteristic		X
Freely-programmable LCD		X
Diagnostic functions		X

Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- · Display of zero correction
- · Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, hPa, kPa, Pa, bar, mbar, torr, atm, psi, $g/cm^2$ , $kg/cm^2$ , $mmH_2O$ , $mmH_2O$ (4 °C), $inH_2O$ , $inH_2O$ (4 °C), $itH_2O$ , $mmHg$ , $inHg$
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m³, dm³, hl, yd³, ft³, in³, US gallon, lmp. gallon, bushel, barrel, barrel liquid
Temperature	K, °C, °F, °R
Miscellaneous	%

Transmitters for gauge pressure for the paper industry

# SITRANS P DS III with PMC connection

# Technical specifications

SITRANS P, DS III series for gauge pressure with PMC conf	nection for the paper	industry		
Input				
Measured variable	Gauge pressure			
Span (fully adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
Lower measuring limit (For PMC-Style Minibolt no span < 500 mbar adjustable)	100 mbar a/10 kPa a	a/1.45 psia	'	'
Upper measuring limit	100% of max. span			
Output	HART		PROFIBUS PA/ FOU	JNDATION Fieldbus
Output signal	4 20 mA		Digital PROFIBUS PA FOUNDATION Fields	
Lower limit (infinitely adjustable)	3.55 mA, factory pre	set to 3.84 mA	-	
Upper limit (infinitely adjustable)	23 mA, factory prese optionally set to 22.0		-	
Load				
Without HART communication	$R_{\rm B} \le (U_{\rm H} - 10.5 \text{ V})/0.00$ $U_{\rm H}$ : Power supply in		-	
With HART communication	$R_{\rm B} = 230 \dots 500 \Omega$ (S $R_{\rm B} = 230 \dots 1100 \Omega$ (	IMATIC PDM) or HART-Communicator)	-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against shother with max. supp		y reversal. Each conn	nection against the
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	s)		
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	<ul> <li>Increasing charact</li> <li>Start-of-scale value</li> <li>Stainless steel sea</li> <li>Silicone oil filling</li> <li>Room temperature</li> </ul>	e 0 bar/kPa/psi I diaphragm		
Measuring span ratio r (spread, Turn-Down)	r = max. measuring	span/set measuring	span or nom. pressur	e range
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 5	≤ 0.075 %			
- 5 < r ≤ 100	$\leq$ (0.005 · r + 0.05) %	6		
Influence of ambient temperature (in percent per 28 °C (50 °F))	$\leq$ (0.08 · r + 0.16) %			
Long-term stability (temperature change $\pm$ 30 °C ( $\pm$ 54 °F))	≤ (0.25 · r) % in 5 ye	ars		
Effect of mounting position		/0.00145 psi per 10° i n is possible with pos	inclination sition error compensat	cion)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V			
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 · 10 <sup>-5</sup> of nominal m	neasuring range		

Transmitters for gauge pressure for the paper industry

# SITRANS P DS III with PMC connection

SITRANS P, DS III series for gauge pressure with PMC cont	nection for the paper industry		
	HART	PROFIBUS PA and FOUNDATION Fieldbus	
Rated conditions			
Degree of protection to IEC 60529	IP66 (optional IP66/IP68), NEMA 4X		
Temperature of medium	-40 +100 °C (-40 +212 °F)		
Ambient conditions			
Ambient temperature	-20 +85 °C (-4 +185 °F)		
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 +185 °F)		
Storage temperature	-50 +85 °C (-58 +185 °F)		
Climatic class			
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for us	ee in the tropics	
Electromagnetic Compatibility			
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21		
Design			
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)		
Enclosure material	Low-copper die-cast aluminum, GD-AlSi1 no. 1.4408	2 or stainless steel precision casting, mat.	
Wetted parts materials			
Gasket (standard)	PTFE flat gasket		
O-ring (minibolt)	FPM (Viton) or optionally: FFPM or NBR		
Measuring cell filling	Silicone oil or inert filling liquid		
Process connection (standard)	Flush-mounted, 11/2", PMC Standard design	gn	
Process connection (minibolt)	Flush-mounted, 1", minibolt design		
Power supply $U_{H}$			
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-	
Power supply	-	Supplied through bus	
Separate 24 V power supply	-	Not necessary	
Bus voltage			
• Not Ex	-	9 32 V	
With intrinsically-safe operation	-	9 24 V	
Current consumption			
Basic current (max.)	-	12.5 mA	
• Start-up current ≤ basic current	-	Yes	
Max. current in event of fault	-	15.5 mA	
Fault disconnection electronics (FDE) available	-	Yes	
Certificates and approvals			
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluarticle 3, paragraph 3 (sound engineering	uid group 1; complies with requirements of g practice)	

Transmitters for gauge pressure for the paper industry

		SITRANS P	DS III with PMC connection
HART communication		FOUNDATION Fieldbus	
HART communication	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	. Idiletieli Sieeli I i
PROFIBUS PA communication		- Adaptation to customer-specif-	Yes, linearly rising or falling
Simultaneous communication with	4	ic process variables	characteristic
master class 2 (max.)	Configuration tool or local appara	- Electrical damping, adjustable	0 100 s
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or		value)
	10 (two measured values)	- Limit monitoring	Yes, one upper and lower warn-
Input byte	0, 1, or 2 (register operating mode and reset function for		ing limit and one alarm limit respectively
	metering)	- Square-rooted characteristic	Yes
Internal preprocessing		for flow measurement	
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Standard FOUNDATION Field- bus function block
Europhian Islandon	3.0, class B	<ul><li>Physical block</li></ul>	1 resource block
<ul><li>Function blocks</li><li>Analog input</li></ul>	2	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	LOD
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Simulation function: Measured pressure value, sensor temper-	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electronics tempera- ture	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
<ul> <li>Physical block</li> </ul>	1		
To a second constant and the	0		

Transducer blocks

two pressures

characteristic with - Square-rooted characteristic

sor temperature

for flow measurement - Gradual volume suppression

• Pressure transducer block - Can be calibrated by applying

- Monitoring of sensor limits

- Specification of a container

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

2

Yes

Yes

Yes

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for gauge pressure for the paper industry

### SITRANS P DS III with PMC connection

Selection and Orderin	•	Art						
SITRANS P pressure t pressure, with PMC co	ransmitters for gauge onnection				1 3			
series DŚ III with HAR			ı			ı		ľ
Click on the Article N ration in the PIA Life	No. for the online configu- Cycle Portal.							
Measuring cell filling	Measuring cell- cleaning							
Silicone oil	normal	1						
Inert liquid	grease-free to cleanliness level 2	3						
Measuring span (min.								
0.01 1 bar <sup>1)</sup>	(0.15 14.5 psi) <sup>1)</sup>	E						
0.04 4 bar 0.1.6 16 bar	(0.58 58 psi) (2.32 232 psi)	0						
	. ,		1					
<b>Wetted parts materials</b> Seal diaphragm	Connection shank							
Hastelloy	Stainless steel		В					
Process connection	3.3000 0.001	-						
<ul> <li>PMC Style Standard:</li> </ul>	Thread 11/2"			2				
PMC Style Minibolt: fr	ont-flush 1" (not with mini-			3				
	(7.25 psi) - version "B")							
Non-wetted parts mate								
Housing made of die-					0			
Housing stainless step	ei precision casting				3			
Version • Standard version, Ger	rman plate inscription					4		
<ul> <li>standard version, Ger setting for pressure ur</li> </ul>						1		
<ul> <li>International version, setting for pressure un</li> </ul>	English plate inscription, nit: bar					2		
Chinese version, Engli setting for pressure un	it: Pascal					3		
	with documentation for English, French, Italian and act operating instructions							
Explosion protection								
<ul><li>None</li><li>With ATEX, Type of pr</li></ul>	otection:						Α	
- "Intrinsic safety (Ex							В	
- "Explosion-proof (Ex	(d)" <sup>2)</sup>						D	
- "Ex nA/ic (Zone 2)" <sup>3</sup>							E	
<ul> <li>FM + CSA intrinsic sa</li> </ul>	` '						F	
<ul> <li>With FM + CSA, Type</li> <li>"Intrinsic Safe and F</li> </ul>	ixplosion Proof (is + xp)" <sup>3)</sup>							
							N	Ü
<ul> <li>Female thread M20 x</li> </ul>	•							В
<ul> <li>Female thread ½-14 N</li> </ul>								C
M12 connectors (stair								F
Display								
Without display	. /-B1							9
<ul> <li>Without visible display setting: mA)</li> </ul>	y (aispiay concealed,							ľ
<ul> <li>With visible display (s</li> </ul>	etting: mA)							
	c display (setting as spec-							ŀ
	Chap. 7 "Supplementary C							

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- sealing ring
- 1) Only with "PMC Style Standard" process connection
- 2) Without cable gland, with blanking plug
- 3) Configurations with M12 connectors are only available in Ex ic.
- 4) Only in connection with Ex approval A, B, E or F.
- 5) M12 delivered without cable socket

Selection and Orderin	g data	Artic	le	Nc	).			
SITRANS P pressure to pressure, with PMC co								
DS III with PROFIBUS	PA (PA)	7 M I	- 4	1 3	4	-		
DS III with FOUNDATION	ON Fieldbus (FF)	7 M I	- 4	1 3	5	-		
	No. for the online configu- Cycle Portal.	П	١	1		1		
Measuring cell filling Silicone oil Inert liquid	Meas. cell cleaning normal grease-free to cleanliness level 2	1 3						
<b>Nominal measuring ra</b> 1 bar <sup>1)</sup> 4 bar 16 bar	(14.5 psi) <sup>1)</sup> (58 psi) (232 psi)	B C D						
Wetted parts materials	S Connection shank							
Seal diaphragm	Stainless steel		3					
Hastelloy .: 2)	Stairliess steel		•					
Process connection <sup>2)</sup> PMC Style Standard: PMC Style Minibolt: fr span: 500 mbar (7.25 1-bar-measuring cell	ont-flush 1" (minimum psi), not available with		3					
<ul><li>Non-wetted parts mate</li><li>Housing made of die-</li><li>Housing stainless ste</li></ul>	cast aluminium			0				
<ul> <li>Setting for pressure un</li> <li>Chinese version, Englisetting for pressure un</li> <li>All versions include DVD</li> <li>SITRANS P in German, E</li> </ul>	nit: bar English plate inscription, nit: bar sh plate inscription, it: Pascal				1 2 3			
Explosion protection								
• None						Α		
<ul> <li>With ATEX, Type of pr</li> <li>"Intrinsic safety (Ex</li> <li>"Explosion-proof (Ex</li> <li>"Ex nA/ic (Zone 2)<sup>44</sup></li> <li>FM + CSA intrinsic sa</li> <li>With FM + CSA, Type</li> </ul>	ia)" ( d)" <sup>3)</sup> i) fe (is)					B D E F		
- "Intrinsic Safe and E	explosion Proof (is + xp)"3)					N C		
• Female thread M20 x • Female thread ½-14 N • M12 connectors (stain	1.5 NPT					B		
<ul><li>Display</li><li>Without display</li><li>Without visible display setting: bar)</li></ul>	y (display concealed,						0 1	
<ul> <li>With visible display (s</li> </ul>	c display (setting as spec-						6 7	

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- sealing ring
- 1) Only with "PMC Style Standard" process connection
- 2) Sealing is included in delivery.
- 3) Without cable gland, with blanking plug
- $^{\rm 4)}$  Configurations with M12 connectors are only available in Ex ic.
- 5) Only in connection with Ex approval A, B, E or F.
- 6) M12 delivered without cable socket

Transmitters for gauge pressure for the paper industry

### SITRANS P DS III with PMC connection

Selection and Ordering data	Order	code		
Further designs		HART	PA	F
Add "-Z" to Article No. and specify Order code.				
Plug				
Angled	A32	✓		
Han 8D (metal, gray)	A33	✓		
M12 cable sockets (metal (CuZn))	A50	✓	✓	
Rating plate inscription (instead of German)				
English	B11	1	✓	
• French	B12	✓	✓	
• Spanish	B13	✓	✓	
• Italian	B14	✓	✓	
Cyrillic (russian)	B16	✓	✓	•
English rating plate	B21	✓	✓	
Pressure units in inH <sub>2</sub> 0 and/or psi				
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	✓	,
Inspection certificate	C12	1	1	
Acc. to EN 10204-3.1				
F4	011	,	,	
Factory certificate	C14	•	<b>V</b>	
Acc. to EN 10204-2.2				
"Functional safety (SIL2)" certificate acc. to IEC 61508	C20	✓		
"Functional safety (SIL2/3)" certificate acc. to IEC 61508	C23	✓		
Device passport Russia	C99	✓	✓	
Output signal can be set to upper limit of 22.0mA	D05	✓	✓	•
<b>Degree of protection IP66/IP68</b> (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	
Export approval Korea	E11	✓	✓	
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>1)</sup>	✓	✓	
(only for transmitter 7MF4				
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>1)</sup>	✓	✓	•
(only for transmitter 7MF4D)				
Ex protection "Zone 2" to NEPSI (China)	E57 <sup>1)</sup>	✓	✓	
(only for transmitter 7MF4				
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>1)</sup>	✓	✓	٠
(only for transmitter 7MF4R)				
Mounting				
<ul> <li>Weldable sockets for standard 1½"</li> </ul>	P01	<b>√</b>	<b>✓</b>	•
threaded connection				

Option does not include ATEX approval, but instead includes only the country-specific approval.

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	1	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)  Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG)  Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
The following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O <sup>*</sup> ), inH <sub>2</sub> O <sup>*</sup> ), ftH <sub>2</sub> O <sup>*</sup> ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C				
Setting of pressure indication in non-pressure units <sup>2)</sup> Specify in plain text: Y22: up to I, m³, m, USg, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	1		
Preset bus address possible between 1 and 126 Max. 8 characters, specify in plain text: Y25:	Y25		✓	1

Only "Y01" and "Y21" can be factory preset

✓ = available

#### ordering example

Item line: 7MF4133-1DB20-1AB7-Z

B line: C11 + Y01 + Y21

C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)

C line: Y21: bar (psi)

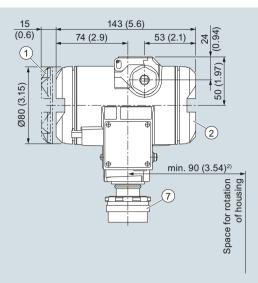
<sup>&</sup>lt;sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for gauge pressure for the paper industry

### SITRANS P DS III with PMC connection

#### Dimensional drawings



29 (1.14) 84 (3.31) (5.5) (7.5

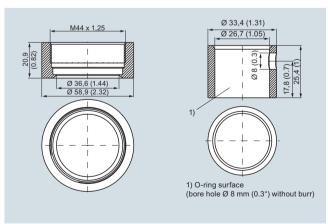
- Electronic side, digital display
   (longer overall length for cover with window)¹¹)
- 2 Terminal side1)
- 3 Electrical connection: Screwed gland M20 x 1,5 or screwed gland ½-14 NPT or M12 conector
- 4) Protective cover over keys
- 5 Blanking plug
- 6 Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- (7) Process connection: PMC standard
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- <sup>2)</sup> 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

SITRANS P DS III pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into  $H_1$  and  $H_2$ .

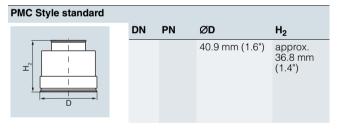
 $\boldsymbol{H}_1 = \text{Height}$  of the SITRANS P DS III up to a defined cross-section

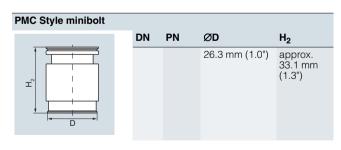
 $H_2$  = Height of the flange up to this defined cross-section Only the height  $H_2$  is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

Material: Stainless steel, Mat. No. 1.4404/316L





Transmitters for gauge pressure for the paper industry

# SITRANS P300 with PMC connection

# Technical specifications

SITRANS P300 for gauge pressure with PMC connection for	the paper industry			
Input				
Measured variable	Gauge pressure (from		ı	
Span (fully adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
Lower measuring limit (For PMC-Style Minibolt no span < 500 mbar adjustable)	100 mbar a/10 kPa a	/1.45 psia	'	'
Upper measuring limit	100 % of max. span			
Output	HART		PROFIBUS PA/ FOU	JNDATION Fieldbu
Output signal	4 20 mA		Digital PROFIBUS PA FOUNDATION Fields	
Lower limit (infinitely adjustable)	3.55 mA, factory pre	set to 3.84 mA	-	
Upper limit (infinitely adjustable)	23 mA, factory prese optionally set to 22.0		-	
Load				
Without HART communication	$R_{\rm B} \leq (U_{\rm H}$ - 10.5 V)/0. $U_{\rm H}$ : Power supply in		-	
With HART communication	$R_{\rm B} = 230 \dots 500 \Omega \text{ (S)} $ $R_{\rm B} = 230 \dots 1100 \Omega \text{ (S)} $ tor)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against shother with max. supp		y reversal. Each conr	nection against the
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	)		
Measuring accuracy	Acc. to IEC 60770-1			
	<ul> <li>Increasing charact</li> <li>Start-of-scale value</li> <li>Stainless steel seal</li> <li>Measuring cell with</li> <li>Room temperature</li> </ul>	e 0 bar/kPa/psi I diaphragm n silicone oil		
Measuring span ratio r (spread, Turn-Down)	r = max. measuring	span/set measuring	span or nom. pressur	e range
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic				
- r≤5	≤ 0.075 %			
- 5 < r ≤ 100	$\leq$ (0.005 · r + 0.05) %	0		
Influence of ambient temperature (in percent per 28 °C (50 °F))	$\leq$ (0.08 · r + 0.16) %			
	≤ (0.25 · r) % in 5 yea	ars		
<b>.</b>	(zero point correction	0.00145 psi per 10° in is possible with pos	inclination sition error compensat	ion)
(in percent per change in voltage)	0.005 % per 1 V			
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 · 10 <sup>-5</sup> of nominal m	easuring range		

Transmitters for gauge pressure for the paper industry

# SITRANS P300 with PMC connection

SITRANS P300 for gauge pressure with PMC connection for the paper industry			
Rated conditions			
Installation conditions			
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.		
Measuring cell with silicone oil	-40 +85 °C (-40 +185 °F)		
Display readable	-30 +85 °C (-22 +185 °F)		
Storage temperature	-50 +85 °C (-58 +185 °F)		
Climatic class			
Condensation	Relative humidity 0 100 % Condensation permissible, suitable for u	se in the tropics	
Degree of protection acc. to EN 60529	IP65, IP68, NEMA 4X, enclosure cleaning	g, resistant to lyes, steam to 150 °C (302 °F)	
Electromagnetic Compatibility			
<ul> <li>Emitted interference and interference immunity</li> </ul>	Acc. to IEC 61326 and NAMUR NE 21		
Medium conditions			
Temperature of medium			
Measuring cell with silicone oil	-40 +100 °C (-40 +212 °F)		
Design			
Weight (without options)	Approx. 1 kg (2.2 lb)		
Enclosure material	Stainless steel, mat. no. 1.4301/304		
Material of parts in contact with the medium			
Seal diaphragm	Hastelloy C276, mat. no. 2.4819		
Measuring cell filling	Silicone oil		
Surface quality touched-by-media	Ra-values $\leq 0.8~\mu m$ (32 $\mu$ inch)/welds Ra	$\leq$ 1.6 $\mu$ m (64 $\mu$ inch)	
Power supply U <sub>H</sub>	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Terminal voltage on transmitter	10.5 42 V DC for intrinsically safe operation: 10.5 30 V DC		
Power supply		Supplied through bus	
Separate power supply	-	Not necessary	
Bus voltage			
• Without Ex	- 9 32 V		
With intrinsically-safe operation	- 9 24 V		
Current consumption			
Max. basic current	-	12.5 mA	
<ul> <li>Start-up current ≤ basic current</li> </ul>	- Yes		
Max. fault current in the event of a fault	- 15.5 mA		
Fault disconnection electronics (FDE) available	- Yes		

Transmitters for gauge pressure for the paper industry

# SITRANS P300 with PMC connection

Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)		
Explosion protection			
Intrinsic safety "i"	PTB 05 ATEX 2048		
Marking	Ex II 1/2 G Ex ia/ib IIB/IIC T4, T5, T6		
Permissible ambient temperature			
• Temperature class T4	-40 +85 °C (-40 +185 °F)		
• Temperature class T5	-40 +70 °C (-40 +158 °F)		
• Temperature class T6	-40 +60 °C (-40 +140 °F)		
Connection	To certified intrinsically-safe circuits with peak values:	To certified intrinsically-safe circuits with peak values:	
	$\label{eq:continuity} \begin{split} &U_{i}=30 \text{ V, } I_{i}=100 \text{ mA,} \\ &P_{i}=750 \text{ mW, } R_{i}=300  \Omega \end{split}$	FISCO supply unit: $U_i = 17.5 \text{ V}, I_i = 380 \text{ mA},$ $P_i = 5.32 \text{ W}$	
		Linear barrier: $U_i = 24 \text{ V}, I_i = 250 \text{ mA}, P_i = 1.2 \text{ W}$	
Effective inner capacitance:	$C_i = 6 \text{ nF}$	C <sub>i</sub> = 1.1 nF	
Effective internal inductance:	$L_i = 0.4 \text{ mH}$	L <sub>i</sub> ≤ 7 μH	
Explosion protection to FM for USA and Canada (cFM <sub>US</sub> )		·	
• Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099		
	CL I, DIV 1, GP ABCD T4 T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia II T4 T6; CL I, DIV 2, GP ABCD T4 T6; CL II, DIV 2, GP FG; CL III		
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C		
	CL I, DIV 1, GP ABCD T4 T6; CL II, DI' DIV 2, GP ABCD T4 T6; CL II, DIV 2, G	V 1, GP EFG; CL III; Ex ia IIC 4 T6; CL I, iP FG; CL III	

Transmitters for gauge pressure for the paper industry

### **SITRANS P300 with PMC connection**

HART communication		
HART	230 1100 Ω	
Protocol	HART Version 5.x	
Software for computer	SIMATIC PDM	
PROFIBUS PA communication		
Simultaneous communication with master class 2 (max.)	4	
The address can be set using	Configuration tool Local operation	
	(standard setting Address 126)	
Cyclic data usage		
Output byte	One measured value: 5 bytes	
	Two measured values: 10 bytes	
Input byte	Register operating mode: 1 bytes	
	Reset function due to metering. 1 bytes	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	
Function blocks	2	
Analog input		
- Adaptation to customer-specific process variables	Linearly rising or falling characteristic	
- Electrical damping	0 100 s adjustable	
- Simulation function	Input /Output	
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively	
Register (totalizer)	Can be reset and preset Optional direction of counting Simulation function of the register output	
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively	
Physical block	1	
Transducer blocks	2	
Pressure transducer block		
- Monitoring of sensor limits	Yes	
- Specification of a container characteristic with	Max. 31 nodes	
- Characteristic curve	Linear	
- Simulation function	Available	
<ul> <li>Transducer block "Electronic temperature"</li> </ul>		
Simulation function	Available	

# FOUNDATION Fieldbus communication

Function blocks

- Analog input
- Adaptation to customerspecific process variables
- Electrical damping, adjustable
- Simulation function
- Failure mode
- Limit monitoring
- Square-rooted characteristic for flow measurement
- PID
- Physical block

Transducer blocks

• Pressure transducer block

- Can be calibrated by applying two pressures
- Monitoring of sensor limits
- Simulation function: Measured pressure value, sensor temperature and electronics temperature

3 function blocks analog input, 1 function block PID

Yes, linearly rising or falling characteristic

0 ... 100 s

Output/input (can be locked within the device with a bridge)

parameterizable (last good value, substitute value, incorrect value)

Yes, one upper and lower warning limit and one alarm limit respectively

Yes

Standard FOUNDATION Fieldbus function block

1 resource block

1 transducer block Pressure with calibration, 1 transducer block LCD

Yes

Yes

Constant value or over parameterizable ramp function

Transmitters for gauge pressure for the paper industry

### SITRANS P300 with PMC connection

Selection and Ordering data Article No.						
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English				TVC	, <u>.</u>	
with 4 20 mA / HART	Г	7MF8123-				
with PROFIBUS PA		7 M	IF 8	1 2	4	
with FOUNDATION Fie	ldbus (FF)	7 M	IF 8	1 2	5 -	
∠ Click on the Article Notion in the PIA Life Cylinder	lo. for the online configura- ycle Portal.	ľ		-		T
Measuring cell filling Silicone oil Inert liquid	Measuring cell cleaning normal Cleanliness level 2 to DIN 25410	1 3				
<b>Measuring span</b> 1 bar <sup>1)</sup> 4 bar 16 bar	(14.5 psi) (58 psi) (232 psi)	B C D				
Wetted parts materials Seal diaphragm	Measuring cell					
Hastelloy	Stainless steel		В			
<ul> <li>PMC Style Standard: Thread 1½"</li> <li>PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B))</li> <li>Non-wetted parts materials</li> <li>Stainless steel, deep-drawn and electrolytically polished</li> </ul>		-	3			
Version • Standard versions					1	
Explosion protection  None					,	Α
<ul> <li>With ATEX, Type of protection: - "Intrinsic safety (Ex ia)"</li> <li>Zone 20/21/22<sup>2</sup>)</li> <li>Ex nA/nL (Zone 2)<sup>3</sup>)</li> <li>With FM + CSA, Type of protection: - "Intrinsic Safe (is)" (planned)</li> </ul>					ı	B C E
Electrical connection/cable entry		-				
<ul> <li>Screwed gland M20 x .5 (polyamide)<sup>4)</sup></li> <li>Screwed gland M20 x 1.5 (metal)</li> <li>Screwed gland M20 x 1.5 (stainless steel)</li> <li>M12 connectors (without cable socket)</li> <li>M12 connectors (stainless steel), without cable socket)</li> </ul>						A B C F G
• ½-14 NPT metal thread <sup>5)</sup> • ½-14 NPT stainless steel thread <sup>5)</sup>						H J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English	
with 4 20 mA / HART	7 M F 8 1 2 3 -
with PROFIBUS PA	7 M F 8 1 2 4 -
with FOUNDATION Fieldbus (FF)	7 M F 8 1 2 5 -
Display     Without display, with keys, closed lid     With display and keys, closed lid	1 2
With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) <sup>6)</sup>	4
<ul> <li>With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane<sup>6)</sup></li> </ul>	5
With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure unit) <sup>6)</sup>	6
With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass panel <sup>6</sup> )	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
• Brief instructions (Leporello)
• DVD with detailed documentation

- sealing ring
- 1) Only with "Standard" process connection"
- 2) Not in conjunction with electrical connection option A.
- $^{\rm 3)}$  Only available together with electrical connection options B, C or G.
- 4) Only together with HART electronics.
- 5) Without cable gland.
- 6) Display cannot be turned.

Transmitters for gauge pressure for the paper industry

### SITRANS P300 with PMC connection

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Cable socket for M12 plug • Stainless steel	A51		✓	1
Rating plate inscription (instead of English) • German • French • Spanish • Italian	B10 B12 B13 B14	* * * * *	V V V	<b>* * * *</b>
English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi	B21	*	· /	<b>√</b>
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	1	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Set output signal to upper limit of 22.0mA	D05	✓	✓	✓
<b>Degree of protection IP65/IP68</b> (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Weldable sockets for standard 1½" threaded connection  Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	P01	✓ ✓	✓	✓

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	✓	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text:	Y15	✓	✓	✓
Y15:  Measuring point text (entry in device variable)	Y16	✓	1	✓
Max. 27 char., specify in plain text: Y16:				
Entry of HART address (TAG)	Y17	✓		
Max. 8 char., specify in plain text: Y17:				
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note: The following pressure units can be selected:				
bar, mbar, mm H <sub>2</sub> O <sup>*)</sup> , inH <sub>2</sub> O <sup>*)</sup> , ftH <sub>2</sub> O <sup>*)</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C				
Setting of pressure indication in non-pressure units <sup>2)</sup>	Y22 + Y01	✓		
Specify in plain text: Y22: up to I, m³, m, USg, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)				
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		1	✓

Only "Y01" and "Y21" can be factory preset

<sup>✓ =</sup> available

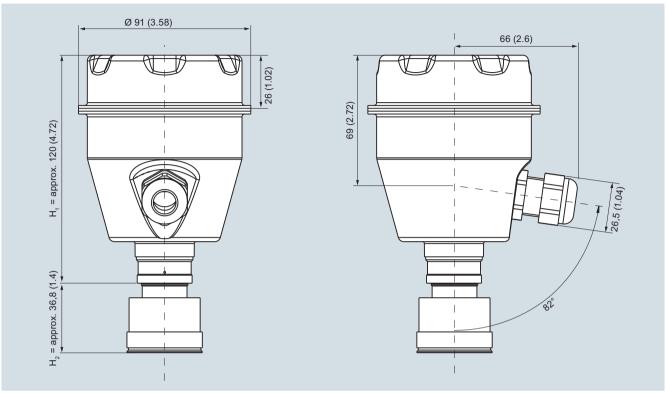
<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>&</sup>lt;sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for gauge pressure for the paper industry

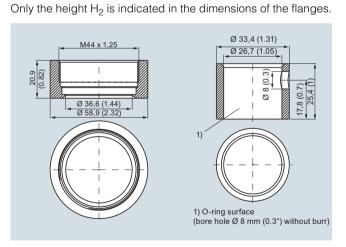
### SITRANS P300 with PMC connection

### Dimensional drawings



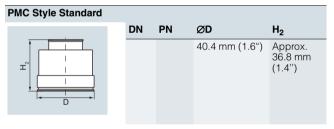
SITRANS P300 pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into  $H_1$  and  $H_2$ .  $H_1$  = Height of the SITRANS P300 up to a defined cross-section  $H_2$  = Height of the flange up to this defined cross-section



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

Material: Stainless steel, mat. No. 1.4404 / 316L



PMC Style Mini bolt				
	DN	PN	ØD	H <sub>2</sub>
T D			26.3 mm (1.0")	Approx. 33.1 mm (1.3")

Transmitters for applications with basic requirements (Basic)

#### SITRANS P310 - Technical description

#### Overview



SITRANS P310 pressure transmitters are digital pressure transmitters with a high level of operating convenience. With a measurement accuracy of 0.075 %, they complement the SITRANS P DS III and round off the portfolio. The parameterization is performed using input buttons or the HART interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P310 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- · Differential pressure
- · Volume flow
- · Mass flow

#### Benefits

- · High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Good long-term stability
- Wetted parts made of high-grade materials (stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Measuring accuracy 0.075 %
- Parameterization over input buttons and HART interface

### Application

SITRANS P310 pressure transmitters are particularly suited for use in the industrial areas of Energy, Oil & Gas as well as Water/Wastewater. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART interface.

#### Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable): 0.01 bar to 700 bar (0.15 psi to 10153 psi)

#### Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow q ~ √∆p (together with a primary differential pressure device (see Chapter "Flow Meters")

Span (infinitely adjustable):

1 mbar ... 30 bar (0.0145 ... 435 psi)

Transmitters for applications with basic requirements (Basic)

#### SITRANS P310 - Technical description

### Design



#### Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

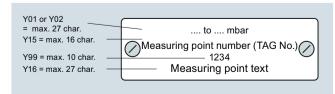
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

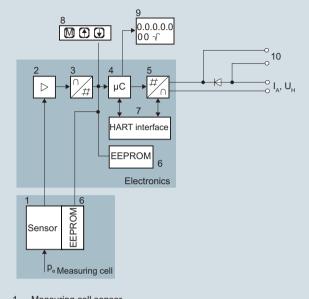
At the top of the housing is a plastic cover (1), which hides the input keys.

#### Example for an attached measuring point label



#### Function

#### Operation of electronics with HART communication



- Measuring cell sensor
- Instrument amplifier
- Analog-to-digital converter
- Microcontroller
- 5 Digital-to-analog converter
- One non-volatile memory each in the measuring cell and electronics
- HART interface
- 8 Three input keys (local operation)
- Digital display
- Diode circuit and connection for external ammeter 10
- Output current
- Power supply
- Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

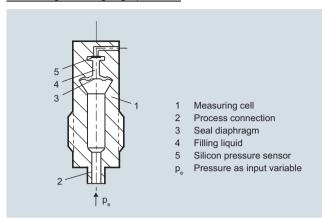
The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Transmitters for applications with basic requirements (Basic)

#### SITRANS P310 - Technical description

#### Mode of operation of the measuring cells

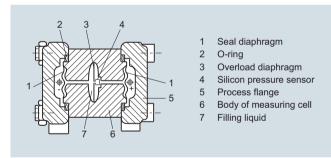
Measuring cell for gauge pressure



Measuring cell for gauge pressure, function diagram

The pressure  $p_e$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

#### Measuring cell for differential pressure and flow



Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

#### Parameterization SITRANS P310

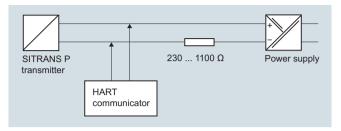
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

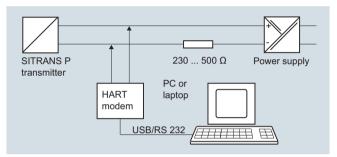
#### Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

#### Adjustable parameters, DS III with HART

Parameters	Input keys (DS III HART)	HART communication
Start of scale	Х	Х
Full-scale value	X	X
Electrical damping	X	X
Start-of-scale value without application of a pressure ("Blind setting")	Х	X
Full-scale value without application of a pressure ("Blind setting")	Х	X
Zero adjustment	X	X
current transmitter	X	X
Fault current	X	Χ
Disabling of buttons, write protection	Х	x <sup>1)</sup>
Type of dimension and actual dimension	X	X
Characteristic (linear / square-rooted)	x <sup>2)</sup>	x <sup>2)</sup>
Input of characteristic		X
Freely-programmable LCD		X
Diagnostic functions		X

- 1) Cancel apart from write protection
- 2) Only differential pressure

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 - Technical description

### Available physical units of display for SITRANS P310 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	$\rm m^3/d,m^3/h,m^3/s,l/min,l/s,ft^3/d,ft^3/min,ft^3/s,US$ gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 for gauge pressure

### Technical specifications

SITRANS P310 for gauge pressure			
Input			
Measured variable	Gauge pressure		
Span (fully adjustable), max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	Span	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
	0.04 4 bar 4 400 kPa 0.58 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 16 bar 16 1600 kPa 2.3 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
	0.63 63 bar 63 6300 kPa 9.1 914 psi	67 bar 6.7MPa 972 psi	100 bar 10 MPa 1450 psi
	1.6 1 bar 0.16 16 MPa 23 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 2.5 MPa 3626 psi
	4 400 bar 0.4 40 kPa 58 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8700 psi
	7 700 bar 0.7 70 MPa 102 10153 psi	800 bar 80 MPa 11603 psi	800 bar 80 MPa 11603 psi
Lower measuring limit			
Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psia		
Upper measuring limit	100 % of max. span		
Start of scale value	Between the measuring limits continuously	y adjustable	
Output			
Output signal	4 20 mA		
Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		
<ul> <li>Upper limit (infinitely adjustable)</li> </ul>	23 mA, factory preset to 20.5 mA or optio	nally set to 22.0 mA	
Load			
Without HART	$R_{\rm B} \leq (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V		
• With HART	$R_{\rm B}$ = 230 500 $\Omega$ (SIMATIC PDM) or $R_{\rm B}$ = 230 1100 $\Omega$ (HART Communicator)		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.		
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s)		

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 for gauge pressure

SITRANS P310 for gauge pressure		
Measuring accuracy	Acc. to IEC 60770-1	
Reference conditions	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Silicone oil filling</li> <li>Room temperature 25 °C (77 °F)</li> </ul>	
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span	
Error in measurement at limit setting incl. hysteresis and reproducibility		
Linear characteristic		
- r≤5	≤ 0.075 %	
- 5 < r ≤ 100	$\leq$ (0.005 · r + 0.07) %	
Influence of ambient temperature (in percent per 28 °C (50 °F))		
• at -40 +85 °C (-40 185 °F)	$\leq$ (0.15 · r + 0.25) %	
Long-term stability (temperature change ± 30 °C (± 54 °F))	$\leq$ (0.25 · r) % in 5 years	
Effect of mounting position	$\leq$ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination (zero point correction is possible with position error compensation)	
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V	
Rated conditions		
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F)	
In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)	
Ambient conditions		
Ambient temperature		
- Transmitter	-40 +85 °C (-40 +185 °F)	
- Display readable	-30 +85 °C (-22 +185 °F)	
Storage temperature	-50 +85 °C (-58 +185 °F)	
Climatic class	D. I. I	
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for use in the tropics	
Electromagnetic Compatibility	4 - 150 01000 - 1111111111111111111111111	
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design	Die gestellunginger O.O.Ley ( A.4.lla)	
Weight (without options)	Die-cast aluminum: ≈ 2.0 kg (≈ 4.4 lb) Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4610	
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819	
Measuring cell filling	Silicone oil	
Process connection	Connection shank G½B to DIN EN 837-1, female thread ½ -14 NPT or male thread M20 x 1.5	
Material of mounting bracket		
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	
<b>Power supply </b> $U_H$ Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 for gauge pressure

SITRANS P, DS III series for gauge pressure	
Certificates and approvals	
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
• Intrinsic safety "i"	PTB 13 ATEX 2007 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +70 °C (-40 +158 °F) temperature class T5; -40 +60 °C (-40 +140 °F) temperature class T6
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$
• Explosion-proof "d"	PTB 99 ATEX 1160
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +60 °C (-40 +140 °F) temperature class T6
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC
Dust explosion protection for zone 20 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 1 D Ex ta IIIC T120 °C Da Ex II 1/2 D Ex ta/tb IIIC T120 °C Da/Db
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$
<ul> <li>Dust explosion protection for zone 21/22 (pending)</li> </ul>	PTB 01 ATEX 2055
- Marking	Ex II 2 D Ex tb IIIC T120 °C Db
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC; $P_{\rm max}$ = 1.2 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc
- Connection (Ex nA)	$U_{\rm m}$ = 45 V
- Connections (Ex ic)	To circuits with values: $U_{\rm i} = 45~{\rm V}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$
<ul> <li>Explosion protection acc. to FM (pending)</li> </ul>	Certificate of Compliance 3008490
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III
• Explosion protection to CSA (pending)	Certificate of Compliance 1153651
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III
HART communication	
HART	230 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for gauge pressure

Selection and Ordering data		Ar	ticl	е	Nc	).			
Pressure transmitter for gauge pressure,			7MF2033-						
SITRANS P310 with HART								ī	
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1-								
Measuring cell filling Measuring cell cleaning									
Silicone oil normal	▶₩	1							
Measuring span (min max.)									
0.01 1 bar (0.15 14.5 psi)	<b>&gt;</b>	E	3						
0.04 4 bar (0.58 58 psi)		(							
0.16 16 bar (2.32 232 psi)									
0.63 63 bar (9.14 914 psi)		E							
1.6 160 bar (23.2 2320 psi)		-	=						
4.0 400 bar (58.0 5802 psi) 7.0 700 bar (102.0 10153 psi)		(	z J						
		ı,	•						
Wetted parts materials Seal diaphragm Process connection									
Stainless steel Stainless steel			A						
Hastelloy Stainless steel Version as diaphragm seal 1) 2) 3) 4)			B						
Process connection  Connection shank G½B to EN 837-1				0					
• Female thread ½-14 NPT				1					
Male thread M20 x 1.5	_			5					
Non-wetted parts materials				_					
Housing made of die-cast aluminium	<b>&gt;</b>				0				
Housing stainless steel precision casting <sup>5)</sup>					3				
Version									
• Standard version, German plate inscription,						1			
setting for pressure unit: bar									
• International version, English plate inscription	, ▶◆					2			
<ul><li>setting for pressure unit: bar</li><li>Chinese version, English plate inscription,</li></ul>	•					3			
setting for pressure unit: Pascal									
All versions include DVD with documentation for									
SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating inst-									
ructions in 21 EU languages.									
Explosion protection									
None							A		
<ul><li>With ATEX, Type of protection:</li></ul>									
- "Intrinsic safety (Ex ia)"							В		
- "Explosion-proof (Ex d)" <sup>6)</sup>							D		
- "Ex nA/ic (Zone 2)" <sup>7)</sup>	• •						E R		
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d +							п		
Zone 1D/2D) <sup>*8) 9)</sup> (pending) • FM + CSA intrinsic safe (is) (pending)							F		
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>9)</sup>							S		
(pending)							٦		
• With FM + CSA, Type of protection:									
<ul> <li>"Intrinsic Safe and Explosion Proof (is + xp)"<sup>6</sup> (pending)</li> </ul>	i) 🄷						N	3	
• Screwed gland M20 x1 .5	<b>&gt;</b>							3	
• Screwed gland ½-14 NPT	•							)	
Han 7D plug (plastic housing) incl. mating connector <sup>10)</sup>								)	
connector <sup>1(1)</sup>									

Selection and Ordering data		Article No.		
Pressure transmitter for gauge pressure,		7MF2033-		
SITRANS P310 with HART				
Display				
Without display	•		0	
<ul> <li>Without visible display (display concealed, setting: mA)</li> </ul>	▶•		1	
• With visible display (setting: mA)			6	
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	•		7	

- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-.Y.-.... and 7MF4900-1...-.B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Han7D plug".
- 6) Without cable gland, with blanking plug
- 7) Configurations with HAN and M12 connectors are only available in Ex ic.
- 8) With enclosed cable gland Ex ia and blanking plug.
- 9) Only in connection with IP66.
- <sup>10)</sup>Only in connection with Ex approval A, B or E.

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for gauge pressure

Selection and Ordering data		Order code
Further designs		
Add "-Z" to Article No. and specify Order code.		
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:		
• Steel		A01
Stainless steel	•	A02
Plug		
Han 7D (metal)		A30
<ul> <li>Han 8D (instead of Han 7D)</li> </ul>		A31
• Angled		A32
Han 8D (metal)		A33
Rating plate inscription (instead of German)		
• French	•	B12
• Spanish	•	B13
English rating plate	•	B21
Pressure units in inH <sub>2</sub> 0 and/or psi		
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup>	•	C11
Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1	•	C12
Factory certificate	•	C14
Acc. to EN 10204-2.2		
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	•	C23
Device passport Russia		C99
Manufacturer's declaration acc. to NACE		D07
(MR 0103-2012 and MR 0175-2009)		
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)		D12
Cable gland and sealing plug made of metal		D32
TAG plate empty (no inscription)		D61
Use in or on zone 1D/2D		E01
Dual seal		E24
Explosion-proof "Intrinsic safety" to NEPSI (China)		E55 <sup>3)</sup>
(only for transmitter 7MF2033B)		
Explosion protection "Explosion-proof" to NEPS (China) (only for transmitter 7MF2033D)		E56 <sup>3)</sup>
Ex protection "Zone 2" to NEPSI (China)		E57 <sup>3)</sup>
(only for transmitter 7MF2033E)		
Transient protector 6 kV (lightning protection)		J01
<ul> <li>We can offer shorter delivery times for configuration</li> </ul>	one	docionated with

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Option does not include ATEX approval, but instead includes only the country-specific approval.

Selection and Ordering data		Order code
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	•	Y01
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text: Y15:	•	Y15
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	•	Y16
Entry of HART address (TAG)	•	Y17
Max. 8 characters, specify in plain text: Y17:		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note: The following pressure units can be selected:	•	Y21
bar, mbar, mm H <sub>2</sub> O <sup>*)</sup> , inH <sub>2</sub> O <sup>*)</sup> , ftH <sub>2</sub> O <sup>*)</sup> , mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C		
Setting of pressure indication in non-pressure units <sup>1)</sup> Specify in plain text: Y22: up to I/min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	•	Y22 + Y01

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Ordering example

Item line: 7MF2033-1EA00-1AA7-Z

B line: A01 + Y01 + Y21

C line: Y01: 10 ... 20 bar (145 ... 290 psi)

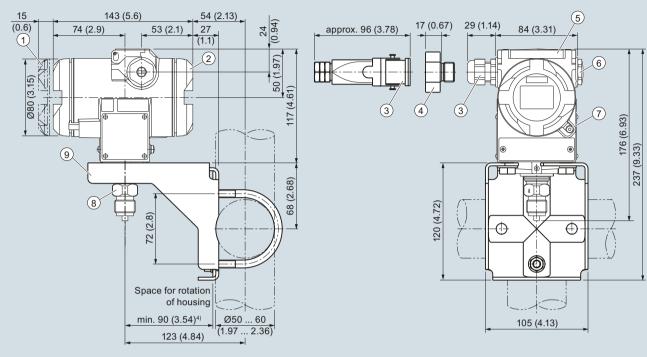
C line: Y21: bar (psi)

<sup>1)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for gauge pressure

### Dimensional drawings



- Electronic side, digital display
   (longer overall length for cover with window)¹¹)
- (2) Terminal side<sup>1)</sup>
- ③ Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/Han 8D<sup>2/3)</sup> plug
- (4) Harting adapter
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- 2) Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- 4) Minimum distance for rotating

- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Process connection: Connection shank G½B
- 9 Mounting bracket (option)

SITRANS P310 pressure transmitters for gauge pressure, dimensions in mm (inch)

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

### Technical specifications

SITRANS P310 for differential pressure and flow					
Input					
Measured variable	Differential pressure and flow				
Span (fully adjustable), max. operating pressure (in	Span	Max. operating pressure MAWP (PS)			
accordance with 97/23/EC Pressure Equipment Directive)	1 60 mbar 0.1 6 kPa 0.4 24 inH <sub>2</sub> O	160 bar 16 MPa 2320 psi			
	2.5 250 mbar 0.2 25 kPa 1 100 inH <sub>2</sub> O				
	6 600 mbar 0.660 kPa 2.4 240 inH <sub>2</sub> O				
	16 1600 mbar 1.6 160 kPa 6.4 642 inH <sub>2</sub> O				
	50 5000 mbar 5500 kPa 20 2000 inH <sub>2</sub> O				
	0.3 30 bar 0.03 3 MPa 4.35 435 psi				
Lower measuring limit					
Measuring cell with silicone oil filling	-100 % of max. measuring rage (-33 % fo 30 mbar a/3 kPa a/0.44 psia	or 30 bar/3 MPa/435 psi cell) or			
Upper measuring limit	100 % of max. span				
Start of scale value	Between the measuring limits continuous	ly adjustable			
Output					
Output signal	4 20 mA				
Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA				
Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optic	onally set to 22.0 mA			
Load					
• Without HART	$R_{\rm B} \le (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V				
• With HART	$R_{\rm B}$ = 230 500 $\Omega$ (SIMATIC PDM) or $R_{\rm B}$ = 230 1100 $\Omega$ (HART Communicate	or)			
Protection against polarity reversal	Protected against short-circuit and polari other with max. supply voltage.	ty reversal. Each connection against the			
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s)				

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

#### SITRANS P310 for differential pressure and flow

#### Measuring accuracy

Reference conditions

(All error data refer always refer to the set span)

Measuring span ratio r (spread, Turn-Down)

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- r≤5
- $-5 < r \le 10$
- Square-rooted characteristic (flow > 50 %)
- r < 5
- 5 < r ≤ 10
- Square-rooted characteristic (flow > 25 ... 50 %)
- r ≤ 5
- $-5 < r \le 10$

Influence of ambient temperature (in percent per 28 °C (50 °F))

• at -40 ... +85 °C (-40 ... +185 °F)

Influence of static pressure

- on the zero point
  - 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi
- on the span

Long-term stability

(temperature change ± 30 °C (± 54 °F))

Effect of mounting position (in pressure per change in angle)

Effect of auxiliary power supply (in percent per change in voltage) Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
  Room temperature 25 °C (77 °F)

r = max. measuring span/set measuring span or nom. pressure range

≤ 0.075 %

 $\leq (0.005 \cdot r + 0.07) \%$ 

≤ 0.075 %

 $\leq$  (0.005 · r + 0.07) %

≤ 0.15 %

 $\leq$  (0.01 · r + 0.14) %

 $\leq$  (0.15 · r + 0.25) %

≤ (0.15 · r) % per 70 bar

(zero point correction is possible with position error compensation)

≤ (0.2 · r) % per 70 bar

(zero point correction is possible with position error compensation)

≤ 0.14 % per 70 bar/7 MPa/1015 psi

 $\leq$  (0.25 · r) % in 5 years

static pressure max. 70 bar/7 MPa/1015 psi

≤ 0.7 mbar/0.07 kPa/0001015 psi per 10° inclination

(zero point correction is possible with position error compensation)

0.005 % per 1 V

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 for differential pressure and flow

Rated conditions	
Hated conditions	
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X
Temperature of medium	
• Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F); -20 +100 °C (-4 +212 °F) with 30 bar measuring cell
In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)
Ambient conditions	
Ambient temperature	
- Transmitter	-40 +85 °C (-40 +185 °F)
- Display readable	-30 +85 °C (-22 +185 °F)
Storage temperature	-50 +85 °C (-58 +185 °F)
Climatic class	
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for use in the tropics
Electromagnetic Compatibility	
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21
Design	
Weight (without options)	Die-cast aluminum: $\approx$ 4.5 kg ( $\approx$ 9.9 lb) Stainless steel precision casting: $\approx$ 7.1 kg ( $\approx$ 15.6 lb)
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408
Wetted parts materials	
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4610
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR
Measuring cell filling	Silicone oil
Process connection	Female thread $^{1}\!$
Material of mounting bracket	
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)
Power supply $ extbf{ extit{U}}_{ ext{H}}$	
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode

Transmitters for applications with basic requirements (Basic)

# SITRANS P310 for differential pressure and flow

SITRANS P310 for differential pressure and flow	
Certificates and approvals	
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
• Intrinsic safety "i"	PTB 13 ATEX 2007 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +70 °C (-40 +158 °F) temperature class T5; -40 +60 °C (-40 +140 °F) temperature class T6
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$
• Explosion-proof "d"	PTB 99 ATEX 1160
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +60 °C (-40 +140 °F) temperature class T6
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC
<ul> <li>Dust explosion protection for zone 20 (pending)</li> </ul>	PTB 01 ATEX 2055
- Marking	Ex II 1 D Ex ta IIIC T120 °C Da Ex II 1/2 D Ex ta/tb IIIC T120 °C Da/Db
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$
	$L_{\rm i} = 7  \mu \text{H},  C_{\rm i} = 1.1  \text{nF}$
Dust explosion protection for zone 21/22 (pending)	PTB 01 ATEX 2055
- Marking	Ex II 2 D Ex tb IIIC T120 °C Db
- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$ ; $P_{\text{max}} = 1.2 \text{ W}$
Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc
- Connection (Ex nA)	$U_{\rm m}$ = 45 V
- Connection (Ex ic)	To circuits with values: $U_i = 45 \text{ V}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$
<ul> <li>Explosion protection acc. to FM (pending)</li> </ul>	Certificate of Compliance 3008490
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III
Explosion protection to CSA (pending)	
1 1 (1 6)	Certificate of Compliance 1153651
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III
HART communication	
HART	$230 \dots 1100 \Omega$
Protocol	HART Version 5.x
Software for PC	SIMATIC PDM

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

2-14:								
Selection and Ordering data			Article No.					
mitters for differential pressure and flow		7MF2433-						
PN 32/160 (MAWP 464/2320 psi)		П	ľ	۱			П	ľ
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
Measuring cell filling Measuring cell clean- ing								
Silicone oil normal	1							
Measuring span (min max.)								
PN 160 (MAWP 2320 psi)		П						
1 60 mbar (0.4015 24.09 inH <sub>2</sub> O) ► • 2.5 250 mbar (1.004 100.4 inH <sub>2</sub> O) ► •		С						
2.5 250 mbar (1.004 100.4 inH <sub>2</sub> O) ► • 6 600 mbar (2.409 240.9 inH <sub>2</sub> O) ► •		D E						
16 1600 mbar (6.424 642.4 inH <sub>2</sub> O) ►•		F						
50 5000 mbar (20.08 2008 inH <sub>2</sub> O) ▶◆		G						
0.3 30 bar (4.35 435 psi)		Н						
Wetted parts materials								
(stainless steel process flanges) Seal diaphragm Parts of measuring cell								
Stainless steel Stainless steel  Hastelloy Stainless steel			A B					
Version for diaphragm seal <sup>1) 2) 3) 4)</sup>			Υ					
Process connection								
Female thread 1/4-18 NPT with flange connection								
• Sealing screw opposite process connection								
- Mounting thread <sup>7</sup> / <sub>16</sub> -20 UNF to IEC 61518				2				
<ul> <li>Mounting thread M10 to DIN 19213 (only for replacement requirement)</li> </ul>			ľ	0				
• Vent on side of process flange <sup>5)</sup>								
<ul> <li>Mounting thread <sup>7</sup>/<sub>16</sub>-20 UNF to IEC 61518</li> </ul>			•	6				
Mounting thread M10 to DIN 19213 (only for replacement requirement)			ľ	4				
Non-wetted parts materials								
orocess flange screws Electronics housing								
Stainless steel Die-cast aluminum					2			
Stainless steel Stainless steel precision casting <sup>6)</sup>					3			
Version								
<ul> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> </ul>						1		
<ul> <li>International version, English plate inscription, ▶</li> </ul>						2		
setting for pressure unit: bar								
<ul> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> </ul>						3	3	
All versions include DVD with documentation for								
SITRANS P in German, English, French, Italian								
and Spanish. Includes Compact operating inst- ructions in 21 EU languages.								
Explosion protection							П	
None							A	
With ATEX, Type of protection:  "Intrinsic pofety (Excip)"							P	
- "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" <sup>7)</sup>							B D	
							P	
<ul> <li>"Intrinsic safety and flameproof enclosure"</li> </ul>								
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" <sup>(3)</sup>							E R	
- "Ex nA/ic (Zone 2)"9)								
- "Ex nA/ic (Zone 2)" <sup>9)</sup> - "Intrinsic safety, explosion-proof enclosure ▶●							n	
- "Ex nA/ic (Zone 2)"9)							n	
<ul> <li>"Ex nA/ic (Zone 2)"<sup>9)</sup></li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"<sup>9)10)</sup> (pending)</li> <li>FM + CSA intrinsic safe (is) (pending)</li> </ul>							F	
<ul> <li>"Ex nA/ic (Zone 2)"9)</li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"9)10) (pending)</li> <li>FM + CSA intrinsic safe (is) (pending)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)10)</li> </ul>								
<ul> <li>"Ex nA/ic (Zone 2)"9)</li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"9)10) (pending)</li> <li>FM + CSA intrinsic safe (is) (pending)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)10) (pending)</li> </ul>							F	
<ul> <li>"Ex nA/ic (Zone 2)"9)</li> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"9)10) (pending)</li> <li>FM + CSA intrinsic safe (is) (pending)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)10)</li> </ul>							F	С

Selection and Ordering data		Article No.		Т
SITRANS P DS III with HART pressure trans-		7 M F 2 4 3 3 -		
mitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)				
Electrical connection/cable entry				
Screwed gland M20 x 1.5			В	
• Screwed gland ½-14 NPT			C	
Han 7D plug (plastic housing) incl. mating connector <sup>1 1) 12)</sup>			D	
Display				
Without display			0	
Without visible display	<b>&gt;</b>		1	
(display concealed, setting: mA)				
<ul> <li>With visible display (setting: mA)</li> </ul>			6	
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22 required)</li> </ul>	•		7	

- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
• Brief instructions (Leporello)

- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included wiht the transmitter order number, for example 7MF443.-..Y..-... and 7MF4900-1...-.B
- 4) The standard measuring cell filling for configurations with remote seals (Y)
- 5) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- 6) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug"
- 7) Without cable gland, with blanking plug
- 8) With enclosed cable gland Ex ia and blanking plug
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- <sup>11)</sup>Only in connection with Ex approval A, B or E.
- <sup>12)</sup>Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

Further designs Add "-Z" to Article No. and specify Order code.  Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of: Statel Stainless steel O-rings for process flanges (instead of FPM (Viton)) PTFE (Teflon) PFEF (Teflon) PFEF (with silicone core, approved for food) FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F) NBR (Buna N) Plug Han 7D (metal) A30 Han 8D (instead of Han 7D) A31 Angled A32 Han 8D (metal) A33 Sealing screws (2 units) W-18 NPT, with valve in mat. of process flanges  Rating plate inscription (instead of German) French Spanish English rating plate Pressure units in inH <sub>2</sub> O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹ Inspection certificate 10 EN 10204-3.1 C12 Factory certificate to use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Purictional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Punctional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Punctional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Punctional safety (SIL2/3) Devices punctional punction set of Hastelloy and stainless steel) Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT) Cable gland and sealing plug made of metal Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges  TAG plate empty (no inscription)	Salastian and Ordaning data		Order code
Add "-Z" to Article No. and specify Order code.  Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:  • Steel • A02  O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon) • A20  • FEPP (with silicone core, approved for food)  • FEPP (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F)  • NBR (Buna N)  plug  • Han 7D (metal) • A30  • Angled • A32  • Han 8D (instead of Han 7D) • A31  • Angled • A33  Sealing screws (2 units) • A40  ¼-18 NPT, with valve in mat. of process flanges  Rating plate inscription (instead of German)  • French • B12  • Spanish • B13  English rating plate  Pressure units in inH <sub>2</sub> O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹  Inspection certificate to EN 10204-2.2 • C14  Functional safety (SIL2) (pending)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2/3)  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68  (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Selection and Ordering data		Order code
(1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:  • Steel  • Steel  • A02  O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • PEP (with silicone core, approved for food)  • FEP (with silicone core, approved for food)  • A20  • A20  • A20  • A21  • A22  • A23  • Da33  • Ba3  • Ba3  • Ba1  • Ba1  • Ba1  • Ba2  • Presure with valve in mat. of process flanges  Rating plate inscription (instead of German)  • French  • Spanish  • B12  • Spanish  • B13  • B21  Prescure units in inH <sub>2</sub> O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup> Inspection certificate to EN 10204-2.2  • C14  • C11  Factory certificate to EN 10204-2.2  • C14  Functional safety (SIL2) (pending)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2)  Orovice passport Russia   Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PT	0		
• Stainless steel  O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • EEP (with silicone core, approved for food)  • FEPW (Kalrez, compound 4079), for measured medium temperatures  -15 100 °C (5 212 °F)  • NBR (Buna N)  Plug  • Han 7D (metal)  • Han 8D (instead of Han 7D)  A31  A32  • Han 8D (instead of Han 7D)  4A31  Sealing screws (2 units)  ¼-18 NPT, with valve in mat. of process flanges  Rating plate inscription (instead of German)  • French  • Spanish  English rating plate  Pressure units in inH <sub>2</sub> O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹) Inspection certificate to EN 10204-3.1  Factory certificate to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2/3)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2/3)  Devices suitable for use according to IEC 61508  and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE  (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68  (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set  (2 items), PTFE packings and screws in thread of process flanges	(1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:	•	A01
(instead of FPM (Viton))  PTFE (Teflon)  FEP (with silicone core, approved for food)  FFPM (Kalrez, compound 4079), for measured medium temperatures  -15 100 °C (5 212 °F)  NBR (Buna N)  Plug  Han 7D (metal)  Han 8D (instead of Han 7D)  A31  Angled  Han 8D (metal)  Sealing screws (2 units)  4-18 NPT, with valve in mat. of process flanges  Rating plate inscription  (instead of German)  French  Spanish  B12  Pressure units in inH <sub>2</sub> O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate to EN 10204-3.1  Factory certificate to EN 10204-3.1  Factory certificate to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68  (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set  (2 items), PTFE packings and screws in thread of process flanges			
Plug	O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • FEP (with silicone core, approved for food)  • FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F)		A20 A21 A22
W-18 NPT, with valve in mat. of process flanges  Rating plate inscription (instead of German)  ● French  ● Spanish  English rating plate Pressure units in inH₂O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate²¹ to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 × 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	<ul><li>plug</li><li>Han 7D (metal)</li><li>Han 8D (instead of Han 7D)</li><li>Angled</li></ul>		A30 A31 A32
(instead of German)  French  Spanish  English rating plate Pressure units in inH₂O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹)  Inspection certificate²) to EN 10204-3.1  Factory certificate to EN 10204-2.2  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	· · · · · ·	•	A40
• French • Spanish  English rating plate Pressure units in inH₂O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate²¹ to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Rating plate inscription		
• Spanish  English rating plate Pressure units in inH₂O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate²¹ to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	(,		
English rating plate Pressure units in inH2O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1</sup> )  Inspection certificate <sup>2</sup> ) to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges			
Pressure units in inH2O and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-21)  Inspection certificate²) to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges			
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹ Inspection certificate²¹ to EN 10204-3.1		_	BZI
Inspection certificate 2) to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges		•	C11
Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	calibration) to IEC 60770-2 <sup>1)</sup>		011
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Inspection certificate <sup>2)</sup> to EN 10204-3.1		C12
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Factory certificate to EN 10204-2.2		C14
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Devices suitable for use according to IEC 61508		C20
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	Devices suitable for use according to IEC 61508	•	C23
(MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)  Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges			C99
(only for M20 x 1.5 and ½-14 NPT)  Cable gland and sealing plug made of metal  Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	(MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastel-		D07
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges  D37			D12
(2 items), PTFE packings and screws in thread of process flanges	Cable gland and sealing plug made of metal		D32
TAG plate empty (no inscription)	(2 items), PTFE packings and screws in thread of		D37
	TAG plate empty (no inscription)		D61

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Export approval Korea	E11
Dual seal	E24
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>3)</sup>
(only for transmitter 7MF4	
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>3)</sup>
(only for transmitter 7MF4D)	
<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4E)	E57 <sup>3)</sup>
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure lines	H03
Transient protector 6 kV (lightning protection)	J01

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Options does not include ATEX approval, but instead includes only the country-specific approval.

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

Selection and Ordering data	Order code
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:  • in the case of linear characteristic curve (max. 5 characters):	Y01
Y01: up to mbar, bar, kPa, MPa, psi	
• in the case of square rooted characteristic	Y02
(max. 5 characters): Y02: up to mbar, bar, kPa, MPa, psi	
Stainless steel tag plate and entry in device variable (measuring point description)	Y15
Max. 16 characters, specify in plain text:	
Y15:	
Measuring point text (entry in device variable)	Y16
Max. 27 char., specify in plain text: Y16:	
Entry of HART address (TAG)	Y17
Max. 8 char., specify in plain text: Y17:	
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:	Y21
The following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O <sup>*</sup> ), inH <sub>2</sub> O <sup>*</sup> ), ftH <sub>2</sub> O <sup>*</sup> ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C	
Setting of pressure indication in	Y22 +
non-pressure units <sup>1)</sup>	<b>Y01</b> or <b>Y02</b>
Specify in plain text: Y22: up to //min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

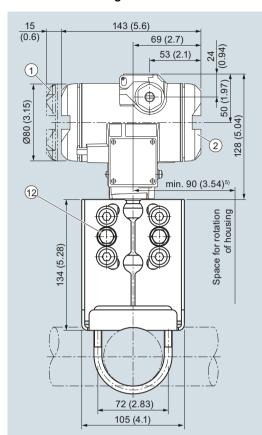
Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

<sup>1)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow

### Dimensional drawings



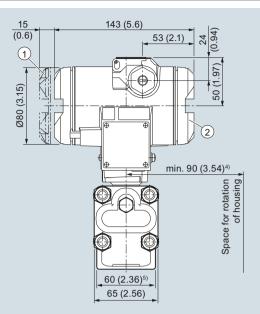
- 1 Electronic side, digital display (longer overall length for cover with window)1)
- 2 Terminal side<sup>1)</sup>
- 3 Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)2)3), Screwed gland M20 x 1,5 or Screwed gland 1/2-14 NPT or Han 7D/ Han 8D<sup>2) 3)</sup> plug
- 4 Harting adapter
- 5 Protective cover over keys

- (6) Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing) 8 Lateral venting for liquid measurement (Standard)
- (9) Lateral venting for gas measurement (suffix H02)
- 10 Mounting bracket (option)
- 11 Sealing screw with valve (option)
- 12 Process connection: 1/4-18 NPT (IEC 61518)
- Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- Not with type of protection "Explosion-proof enclosure"
- Not with type of protection "FM + CSA" [IS + XP]" For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P310 pressure transmitters for differential pressure and flow, dimensions in mm (inch)

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 for differential pressure and flow



- approx. 96 (3.78)

  17 (0.67)

  29 (1.14)<sup>8)</sup>

  84 (3.31)

  6

  (7)

  (8)

  (8)

  (8)

  (9)

  (1.14)<sup>8)</sup>

  (9)

  (1.14)<sup>8)</sup>

  (1.14)<sup>8</sup>

  (1.1
- Electronic side, digital display
   (longer overall length for cover with window)¹¹)
- 2 Terminal side1)
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)<sup>2) 3)</sup>, Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2) 3)</sup> plug
- 4 Harting adapter
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- 2) Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- <sup>4)</sup> 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
- 5) 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 6) 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 7) 219 mm (8.62 inch) for PN  $\geq$  420 (MAWP  $\geq$  6092 psi)
- 8) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Sealing screw with valve (option)
- 9 Process connection: 1/4-18 NPT (IEC 61518)

SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Transmitters for applications with basic requirements (Basic)

### SITRANS P310 Accessories/Spare Parts

Selection and Ordering data	Article No.
Spare parts/Accessories	
Mounting bracket and fastening parts	
for pressure transmitters	
SITRANS P310 (7MF2033C.)  • made of steel	7MF4997-1AB
made of stainless steel	7MF4997-1AB
	7 WII 4997-1AI1
Mounting bracket and fastening parts for pressure transmitters	
SITRANS P310	
(7MF2033A.,B.,D. andF.)	
made of steel	7MF4997-1AC
made of stainless steel	7MF4997-1AJ
Mounting and fastening brackets	
For differential pressure transmitters with	
flange thread M10 SITRANS P310 (7MF2433)	
• made of steel	7MF4997-1AD
made of stainless steel	7MF4997-1AK
Mounting and fastening brackets	
For differential pressure transmitters with	
flange thread 7/16 -20 UNF	
SITRANS P310(7MF2533)	78454007.445
made of steel     made of stainless steel	7MF4997-1AF 7MF4997-1AM
	/WF4997-TAW
Cover	
made of die-cast aluminum, including gasket  • without window	7ME4007 4DD
with window	7MF4997-1BB 7MF4997-1BE
	7 WII 4997-1DL
Cover	
made of stainless steel, including gasket	71154007 400
<ul><li>without window</li><li>with window</li></ul>	7MF4997-1BC 7MF4997-1BF
	_
Digital indicator Including mounting material	7MF4997-1BR
Measuring point label	
without inscription (5 units)	7MF4997-1CA
Printed (1 unit)	7MF4997-1CB-Z
Data according to Y01 or Y02, Y15, Y16 and	Y:
Y99 (see "Pressure transmitters")	_
Mounting screws	
For measuring point label, grounding and connection terminals or for display	7MF4997-1CD
(50 units)	
Sealing screws	_
(1 set = 2 units) for process flange	
made of stainless steel	7MF4997-1CG
made of Hastelloy	7MF4997-1CH
Sealing screws with vent valve	
Complete (1 set = 2 units)	7ME4007 400
made of stainless steel     made of Hastollov	7MF4997-1CP 7MF4997-1CQ
made of Hastelloy	/WIF455/-1CQ
O-rings for process flanges made of:	7MF4997-2DA
<ul><li>FPM (Viton)</li><li>PTFE (Teflon)</li></ul>	7MF4997-2DA 7MF4997-2DB
• FEP (with silicone core, approved for food)	7MF4997-2DC
• FFPM (Kalrez, compound 4079)	7MF4997-2DD
• NBR (Buna N)	7MF4997-2DE
Sealing ring for process connection	see "Fittings"
Available ex stock	300
Available ex Stock	

Selection and Ordering data	Article No.
Operating Instructions <sup>1)</sup>	
German	A5E35603949
• English	A5E32840538
• French	A5E35603976
Spanish	A5E35604019
• Italian	A5E35604068
Chinese	A5E32840562
Compact operating instructions	_
<ul> <li>English, German, Spanish, French, Italian, dutch</li> </ul>	A5E35075329
<ul> <li>English, Estonian, Latvian, Lithuanian, Polish, Romanian, Croatian</li> </ul>	A5E35075417
<ul> <li>English, Bulgarian, Czech, Finnish, Slovakian, Slovenian</li> </ul>	A5E35075434
<ul> <li>English, Danish, Greek, Portuguese, Swedish, Hungarian</li> </ul>	A5E35075441
<ul> <li>Korean, Portuguese (Brazil)</li> <li>The compact operating instructions are available in 21 EU languages on the product DVD supplied with each transmitter. They can also be downloaded from the SITRANS P web page.</li> </ul>	A5E35075442
Brief instruction (Leporello)	
<ul> <li>for SITRANS P310</li> <li>German, english, french, italian, spanish, portuguese, chinese</li> </ul>	A5E32868055
DVD with SITRANS P documentation	A5E00090345
German, English, French, Spanish, Italian incl. compact operating instructions in 21 EU languages	
Certificates (order only via SAP)	_
instead of Internet download • hard copy (to order) • on DVD (to order)	A5E03252406 A5E03252407
HART modem with USB interface	7MF4997-1DB
A. a. Halala and ataul.	

► Available ex stock

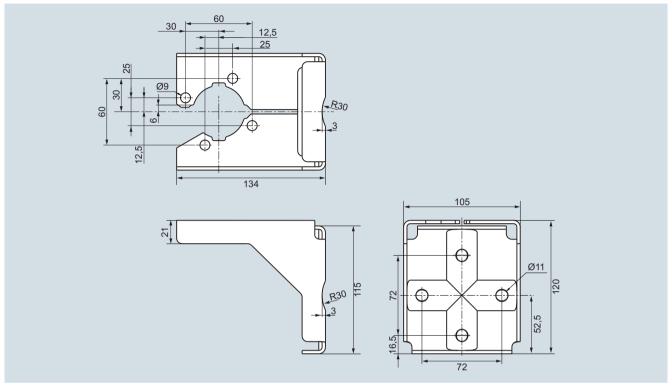
Power supply units see Chap. 7 "Supplementary Components".

You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

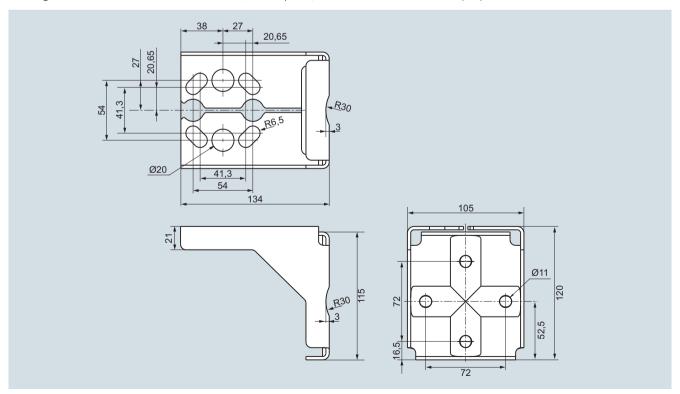
Transmitters for applications with basic requirements (Basic)

#### **SITRANS P310 Accessories/Spare Parts**

#### Dimensional drawings



Mounting bracket for SITRANS P310 gauge and absolute pressure-transmitters, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P310 differential pressure transmitter, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

#### Overview



SITRANS P DS III pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

Various versions of the DS III pressure transmitters are available for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume level
- · Mass level
- · Volume flow
- Mass flow

#### Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Minimum conformity error
- · Good long-term stability
- Wetted parts made of high-grade materials (e.g. stainless steel, Hastelloy, gold, Monel, tantalum)

- Infinitely adjustable span from 0.01 bar to 700 bar (0.15 psi to 10153 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 700 bar (14.5 psi to 10153 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- · High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA, or FOUNDATION Fieldbus interface.

#### Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be programmed locally using the 3 control buttons or externally via HART or PROFIBUS PA or FOUNDATION Fieldbus interface.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

#### Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

for DS III with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

Nominal measuring range for DS III with PROFIBUS PA and FOUNDATION Fieldbus: 1 bar to 700 bar (14.5 psi to 10153 psi)

#### Pressure transmitters for absolute pressure

Measured variable: Absolute pressure of aggressive and nonaggressive gases, vapors and liquids.

Span (infinitely adjustable)

for DS III with HART: 8.3 mbar a ... 100 bar a (0.12 ... 1450 psia)

Nominal measuring range for DS III with PROFIBUS PA and FOUNDATION Fieldbus: 250 mbar a ... 100 bar a (3.6 ... 1450 psia)

There are two series:

- Gauge pressure series
- Differential pressure series

#### Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow q ~ √∆p (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)

for DS III with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range

for DS III with PROFIBUS PA and FOUNDATION Fieldbus: 20 mbar ... 30 bar (0.29 ... 435 psi)

#### Pressure transmitters for level

Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.

Span (infinitely adjustable)

for DS III with HART: 25 mbar ... 5 bar (0.363 ... 72.5 psi)

Nominal measuring range for DS III with PROFIBUS PA and FOUNDATION Fieldbus: 250 mbar ... 5 bar (3.63 ... 72.5 psi)

#### Nominal diameter of the mounting flange

- DN 80 or DN 100
- 3 inch or 4 inch

In the case of level measurements in open containers, the lowpressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed containers, the lowerpressure connection has to be connected to the container in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

#### Design



Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

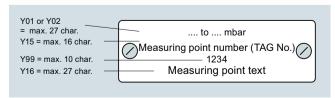
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

#### Example for an attached measuring point label

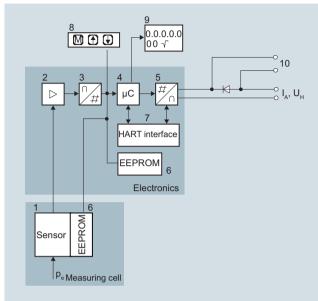


Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

#### Function

#### Operation of electronics with HART communication



- 1 Measuring cell sensor
- 2 Instrument amplifier
- 3 Analog-to-digital converter
- 4 Microcontroller
- 5 Digital-to-analog converter
- 6 One non-volatile memory each in the measuring cell and electronics
- 7 HART interface
- 8 Three input keys (local operation)
- 9 Digital display
- 10 Diode circuit and connection for external ammeter
- I Output current
- U<sub>H</sub> Power supply
- P<sub>e</sub> Input variable

#### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

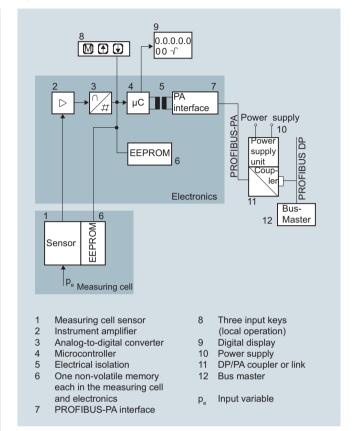
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans  $\leq$  63 bar measure the input pressure compared to atmosphere, transmitters with spans  $\geq$  160 bar compared to vacuum.

#### Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

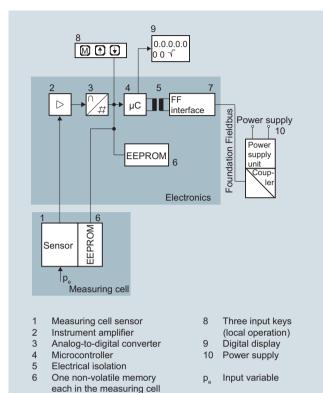
Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

## Operation of electronics with FOUNDATION Fieldbus communication



#### Function diagram of electronics

and electronics FF interface

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

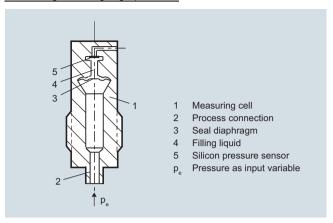
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

#### Mode of operation of the measuring cells

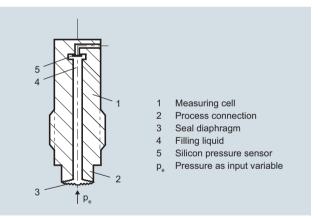
Measuring cell for gauge pressure



Measuring cell for gauge pressure, function diagram

The pressure  $p_e$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for gauge pressure with front-flush diaphragm



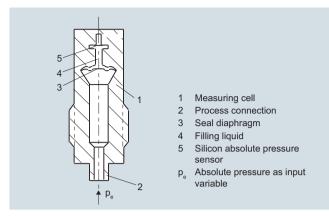
Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure  $p_e$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

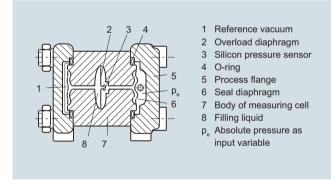
#### Measuring cell for absolute pressure from gauge pressure series



Measuring cell for absolute pressure from the pressure series, function diagram

The absolute pressure  $p_e$  is transmitted through the seal diaphragm (3, Figure "Measuring cell for absolute pressure from pressure series, gauge pressure, function diagram ") and the filling liquid (4) to the silicon absolute pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for absolute pressure from differential pressure series



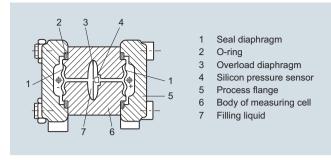
Measuring cell for absolute pressure from differential pressure series, function diagram

The input pressure  $p_e$  is transmitted through the seal diaphragm (6, Figure "Measuring cell for absolute pressure from differential pressure series, function diagram") and the filling liquid (8) to the silicon pressure sensor (3).

The difference in pressure between the input pressure  $p_e$  and the reference vacuum (1) on the low-pressure side of the measuring cell flexes the measuring diaphragm. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (2) is flexed until the seal diaphragm rests on the body of the measuring cell (7), thus protecting the silicon pressure sensor from overloads.

#### Measuring cell for differential pressure and flow



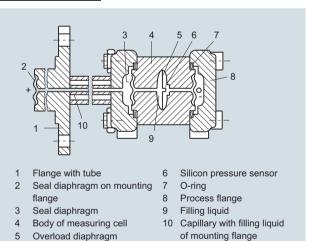
Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

#### Measuring cell for level



Measuring cell for level, function diagram

The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell through the seal diaphragm on the mounting flange (2, Figure "Measuring cell for level, function diagram"). This differential pressure is subsequently transmitted further through the measuring cell (3) and the filling liquid (9) to the silicon pressure sensor (6) whose measuring diaphragm is then flexed.

This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit.

This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (5) is flexed until the seal diaphragm rests on the body of the measuring cell (4), thus protecting the silicon pressure sensor from overloads.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Technical description

#### Parameterization DS III

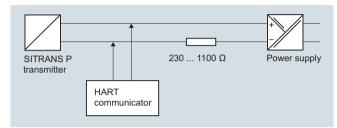
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

#### Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

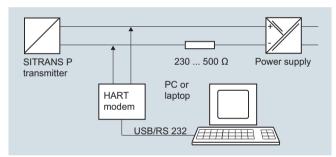
#### Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

### Adjustable parameters, DS III with HART

Adjustable parameters, Do in with IATT						
Parameters	Input keys (DS III HART)	HART communication				
Start of scale	X	Х				
Full-scale value	X	X				
Electrical damping	X	X				
Start-of-scale value without application of a pressure ("Blind setting")	Х	Х				
Full-scale value without application of a pressure ("Blind setting")	Х	Х				
Zero adjustment	X	X				
current transmitter	X	X				
Fault current	X	X				
Disabling of buttons, write protection	Х	x <sup>1)</sup>				
Type of dimension and actual dimension	Х	Х				
Characteristic (linear / square-rooted)	x <sup>2)</sup>	x <sup>2)</sup>				
Input of characteristic		X				
Freely-programmable LCD		X				
Diagnostic functions		×				

<sup>1)</sup> Cancel apart from write protection

2) Only differential pressure

#### Diagnostic functions for DS III with HART

- · Zero correction display
- Event counter
- Limit transmitter
- · Saturation alarm
- Slave pointer
- · Simulation functions
- Maintenance timer

#### Available physical units of display for DS III with HART

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	$\rm m^3/d,m^3/h,m^3/s,l/min,l/s,ft^3/d,ft^3/min,ft^3/s,US$ gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

#### Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Through the PROFIBUS the DS III with PROFIBUS PA is connected to a process control system, e. g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

#### Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

## Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus

Parameters	Input keys	PROFIBUS PA and FOUNDATION Field-bus interface
Electrical damping	X	X
Zero adjustment (correction of position)	Х	X
Buttons and/or function disabling	X	X
Source of measured-value display	х	X
Physical dimension of display	X	X
Position of decimal point	X	X
Bus address	х	X
Adjustment of characteristic	X	X
Input of characteristic		X
Freely-programmable LCD		X
Diagnostics functions		X

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III - Technical description

# Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mmH $_2$ O, mmH $_2$ O (4 °C), inH $_2$ O, inH $_2$ O (4 °C), ftH $_2$ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid
volume flow	m³/s, m³/min, m³/h, m³/d, l/s, l/min, l/h, l/d, Ml/d, ft³/s, ft³/min, ft³/h, ft³/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge pressure

### Technical specifications

reclinical specifications					
SITRANS P, DS III series for gauge pressure					
Input					
Measured variable	Gauge pressure				
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus			
(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure	
	8.3 250 mbar 0.83 25 kPa 0.12 3.6 psi	250 mbar 25 kPa 3.6 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi	
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi	
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi	
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi	
	0.63 63 bar 63 6300 kPa 9.1 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi	
	1.6 160 bar 0.16 16 MPa 23 2321 psi	160 bar 16 MPa 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 25 MPa 3626 psi	
	4 400 bar 0.4 40 MPa 58 5802 psi	400 bar 40 MPa 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8702 psi	
	7 700 bar 0.7 70 MPa 102 10153 psi	700 bar 70 MPa 10153 psi	800 bar 80 MPa 11603 psi	800 bar 80 MPa 11603 psi	
Lower measuring limit		I	I		
(for 250mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant upt to 30 mbar a/3 kPa a/0.44 psi a.)					
Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0	.44 psia			
Measuring cell with inert filling liquid	30 mbar a/3 kPa a/0	.44 psia			
Upper measuring limit		(max. 100 bar/10 MPa e/process temperature	a/1450 psi for oxygen e 60 °C (140 °F)	measurement)	
Output	HART		PROFIBUS PA/FOU	NDATION Fieldbus	
Output signal	4 20 mA		Digital PROFIBUS PA	and FOUNDATION	
<ul> <li>Lower limit (infinitely adjustable)</li> </ul>	3.55 mA, factory pre	set to 3.84 mA	-		
Upper limit (infinitely adjustable)	23 mA, factory prese optionally set to 22.0	et to 20.5 mA or ) mA	-		
Load					
Without HART	$R_{\rm B} \le (U_{\rm H} - 10.5 \text{ V})/0.00$ $U_{\rm H}$ : Power supply in	023 A in Ω, V	-		
• With HART	$R_{\rm B} = 230 \dots 500 \Omega$ (S $R_{\rm B} = 230 \dots 1100 \Omega$ (	IMATIC PDM) bzw. HART-Communicator)	-		
Physical bus	-		IEC 61158-2		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.				
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s)				

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge pressure

#### SITRANS P, DS III series for gauge pressure

#### Measuring accuracy

Reference conditions

Measuring span ratio r (spread, Turn-Down)

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic
- 250 mbar/25 kPa/3.6 psi

1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi
 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi

 400 bar/40 MPa/5802 psi 700 bar/70 MPa/10152 psi

Influence of ambient temperature (in percent per 28 °C (50 °F))

- 250 mbar/25 kPa/3.6 psi
- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
   16 bar/1.6 MPa/232 psi
   63 bar/6.3 MPa/914 psi
   160 bar/16 MPa/2321 psi
   400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10152 psi

Long-term stability (temperature change ± 30 °C (± 54 °F))

- 250 mbar/25 kPa/3.6 psi
- 1 bar/100 kPa/3.6 psi
   4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10152 psi

Effect of mounting position

Effect of auxiliary power supply (in percent per change in voltage)

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- · Silicone oil filling
- Room temperature 25 °C (77 °F)

r = max. measuring span/set measuring span or nom. pressure range

 $r \le 1.25$ :  $\le 0.065$  %

 $1.25 < r \le 30$ :  $\le (0.008 \cdot r + 0.055)$  %

 $r \le 5$ :  $\le 0.065 \%$ 

 $5 < r \le 100$ :  $\le (0.004 \cdot r + 0.045) \%$ 

 $r \le 3$ :  $\le 0.075 \%$ 

 $3 < r \le 10$ :  $\le (0.0029 \cdot r + 0.071) \%$  $10 < r \le 100$ :  $\le (0.005 \cdot r + 0.05) \%$ 

 $\leq$  (0.16 · r + 0.1) %

 $\leq$  (0.05 · r + 0.1) %

 $\leq$  (0.025 · r + 0.125) %

 $\leq$  (0.08 · r + 0.16) %

≤ (0.25 · r) % per year

≤ (0.25 · r) % in 5 years

≤ (0.125 · r) % in 5 years

≤ (0.25 · r) % in 5 years

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination

(zero point correction is possible with position error compensation)

0.005 % per 1 V

 $3 \cdot 10^{-5}$  of nominal measuring range

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P DS III for gauge pressure

SITRANS P, DS III series for gauge pressure					
Rated conditions					
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X				
Temperature of medium					
<ul> <li>Measuring cell with silicone oil filling</li> </ul>	-40 +100 °C (-40 +212 °F)				
Measuring cell with inert filling liquid					
<ul> <li>1 bar/100 kPa/3.6 psi</li> <li>4 bar/400 kPa/58 psi</li> <li>16 bar/1.6 MPa/232 psi</li> <li>63 bar/6.3 MPa/914 psi</li> </ul>	-40 +85 °C (-40 +185 °F)				
- 160 bar/16 MPa/2321 psi 400 bar/40 MPa/5802 psi 700 bar/70 MPa/10152 psi	-20 +100 °C (-4 +212 °F)				
• In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)				
Ambient conditions					
Ambient temperature					
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 +185 °F)				
- Display readable	-30 +85 °C (-22 +185 °F)				
Storage temperature	-50 +85 °C (-58 +185 °F)				
Climatic class					
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for us	e in the tropics			
Electromagnetic Compatibility					
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21				
Design					
Weight (without options)	Die-cast aluminum: $\approx$ 2.0 kg ( $\approx$ 4.4 lb) Stainless steel precision casting: $\approx$ 4.6 kg ( $\approx$ 10.1 lb)				
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408				
Wetted parts materials					
Connection shank	Stainless steel, mat. no. 1.4404/316L or H	lastelloy C4, mat. no. 2.4610			
Oval flange	Stainless steel, mat. no. 1.4404/316L				
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or H	lastelloy C276, mat. no. 2.4819			
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measureme (140 °F))	nt pressure 100 bar (1450 psi) at 60 °C			
Process connection	Connection shank G½B to DIN EN 837-1, (PN 160 (MAWP 2320 psi)) to DIN 19213 to EN 61518	female thread $\frac{1}{2}$ -14 NPT or oval flange with mounting thread M10 or $\frac{7}{16}$ -20 UNF			
Material of mounting bracket					
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plat	ted			
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS	304)			
Power supply $U_{\mathbb{H}}$	HART	PROFIBUS PA/FOUNDATION Fieldbus			
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-			
Power supply	-	Supplied through bus			
Separate 24 V power supply	-	Not necessary			
Bus voltage					
• Not Ex	-	9 32 V			
With intrinsically-safe operation	-	9 24 V			
Current consumption					
Basic current (max.)	-	12.5 mA			
• Start-up current ≤ basic current	- Yes				
Max. current in event of fault		15.5 mA			
Fault disconnection electronics (FDE) available	-	Yes			

Transmitters for applications with advanced requirements (Advanced)

## SITRANS P DS III for gauge pressure

SITRANS P, DS III series for gauge pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus					
Certificates and approvals							
Classification according to PED 97/23/EC		For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)					
Explosion protection							
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	PTB 13 ATEX 2007 X					
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb					
- Permissible ambient temperature	-40 +70 °C (-40 +158 °F) temperatu	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +70 °C (-40 +158 °F) temperature class T5; -40 +60 °C (-40 +140 °F) temperature class T6					
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $P_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 174 \text{ mA}, P_0 = 1 \text{ W}$					
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_i = 7 \mu H, C_i = 1.1 nF$					
• Explosion-proof "d"	PTB 99 ATEX 1160	I					
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb						
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatu -40 +60 °C (-40 +140 °F) temperatu						
- Connection	To circuits with values: $U_{\rm H} = 10.5 \dots 45 \text{ V DC}$	To circuits with values: $U_{\rm H} = 9 \dots 32 \text{ V DC}$					
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	'					
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db						
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)						
- Max. surface temperature	120 °C (248 °F)						
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $P_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1 \text{ W}$					
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_i = 7 \mu H, C_i = 1.1 nF$					
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055						
- Marking	Ex II 2 D Ex tb IIIC T120°C Db						
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC; $P_{\rm max}$ = 1.2 W	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}; P_{\text{max}} = 1 \text{ W}$					
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X						
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc						
- Connection (Ex nA)	$U_{\rm m} = 45  {\rm V}$	$U_{\rm m} = 32  {\rm V}$					
- Connections (Ex ic)	To circuits with values: $U_{\rm i} = 45 \text{ V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V}, I_0 = 570 \text{ mA}$ Linear barrier: $U_0 = 32 \text{ V}, I_0 = 132 \text{ mA}, P_0 = 1 \text{ W}$					
- Effective internal inductance/capacitance	$L_{\rm i}$ = 0.4 mH, $C_{\rm i}$ = 6 nF	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$					
• Explosion protection acc. to FM	Certificate of Compliance 3008490						
- Identification (XP/DIP) or (IS); (NI)		CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III					
• Explosion protection to CSA	Certificate of Compliance 1153651	Certificate of Compliance 1153651					
- Identification (XP/DIP) or (IS)		CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III					

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge pressure

HART		FOUNDATION Establ
HART communication	230 1100 Ω	FOUNDATION Fieldb communication
HART		Function blocks
Protocol  Coffware for computer	HART Version 5.x	
Software for computer  PROFIBUS PA communication	SIMATIC PDM	<ul> <li>Analog input</li> </ul>
Simultaneous communication with	4	<ul> <li>Adaptation to cust ic process variable</li> </ul>
master class 2 (max.)		- Electrical damping
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Simulation function
Cyclic data usage		- Failure mode
Output byte	5 (one measured value) or 10 (two measured values)	- Limit monitoring
• Input byte	0, 1, or 2 (register operating mode and reset function for	
Internal preprocessing	metering)	<ul> <li>Square-rooted cha for flow measurem</li> </ul>
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID
Fire etter tele elle	3.0, class B	<ul> <li>Physical block</li> </ul>
Function blocks	2	Transducer blocks
Analog input  Adaptation to gustomer angulf	Van linearly riging or folling	
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated two pressures</li> </ul>
- Simulation function	Input /Output	- Monitoring of sens
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	<ul> <li>Simulation function pressure value, se</li> </ul>
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively	ature and electron ture
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)	
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively	
<ul> <li>Physical block</li> </ul>	1	
Transducer blocks	2	
Pressure transducer block		
<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes	
- Monitoring of sensor limits	Yes	
<ul> <li>Specification of a container characteristic with</li> </ul>	Max. 30 nodes	
<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes	
<ul> <li>Gradual volume suppression and implementation point of square-root extraction</li> </ul>	Parameterizable	
Olas detien for etter for	0	

Constant value or over parame-

terizable ramp function

lbus

- stomer-specif-
- ng, adjustable
- on
- naracteristic ment
- er block
- d by applying
- nsor limits
- on: Measured sensor tempernics tempera-

3 function blocks analog input, 1 function block PID

Yes, linearly rising or falling characteristic

0 ... 100 s

Output/input (can be locked within the device with a bridge)

parameterizable (last good value, substitute value, incorrect value)

Yes, one upper and lower warning limit and one alarm limit respectively

Yes

Standard FOUNDATION Fieldbus function block

1 resource block

1 transducer block Pressure with calibration, 1 transducer block LCD

Yes

Constant value or over parameterizable ramp function

- Simulation function for mea-

sor temperature

sured pressure value and sen-

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge pressure

Selection and Orderin Pressure transmitter f						Nc			
SITRANS P DS III with	or gauge pressure, HART								
				٦	г	•	٦	7	
Click on the Article N ration in the PIA Life	lo. for the online configu Cycle Portal.	J-							
Measuring cell filling	Measuring cell clean	-							
Silicone oil	normal	<b>&gt;</b>	1						
Inert liquid <sup>1)</sup>	grease-free to	_	3						
more negata	cleanliness level 2								
Measuring span (min.	max.)								
8.3 250 mbar	(0.12 3.6 psi)			A					
0.01 1 bar	(0.15 14.5 psi)			В					
0.04 4 bar	(0.58 58 psi)			С					
0.16 16 bar	(2.32 232 psi)			D					
0.63 63 bar	(9.14 914 psi)			E					
1.6 160 bar	(23.2 2320 psi)			F					
4.0 400 bar	(58.0 5802 psi)			G					
7.0 700 bar	(102.010153 psi)			J					
Wetted parts materials Seal diaphragm	Process connection								
Stainless steel	Stainless steel	_ <b>&gt;</b> •		,					
	Stainless steel			A E					
Hastelloy Hastelloy	Hastelloy			C					
Version as diaphragm s	eal 2) 3) 4) 5)			Υ					
Process connection				ı					
Connection shank G1/2	B to FN 837-1	<b>&gt;</b>			0				
<ul> <li>Female thread ½-14 N</li> </ul>		•			1				
<ul> <li>Stainless steel oval fla</li> </ul>					ľ				
nection (Oval flange has no female thread)									
	<sub>3</sub> -20 UNF to IEC 61518				2				
<ul> <li>Mounting thread M1</li> </ul>					3				
- Mounting thread M1					4				
Male thread M20 x 1.5					5				
Male thread ½ -14 NP					6				
Non-wetted parts mate						_			
<ul> <li>Housing made of die-</li> <li>Housing stainless stee</li> </ul>						0 3			
	er precision casting 7					3			
Version • Standard version, Ger	rman plata inscription						1		
setting for pressure ur		_					ľ		
<ul> <li>International version, English plate inscription setting for pressure unit: bar</li> </ul>		ı, <b>&gt; •</b>					2		
Chinese version, English plate inscription,							3		
setting for pressure unit: Pascal									
All versions include DVD									
SITRANS P in German, E and Spanish. Includes C									
ructions in 21 EU langua									
Explosion protection									
• None								Α	
<ul> <li>With ATEX, Type of present</li> </ul>									
- "Intrinsic safety (Ex i								В	
- "Explosion-proof (Ex								D	
<ul> <li>"Intrinsic safety and (Ex ia + Ex d)"<sup>8)</sup></li> </ul>	flameproof enclosure"							Р	
- "Ex nA/ic (Zone 2)" <sup>9)</sup>	)							Е	
	losion-proof enclosure	<b>&gt;</b>						R	
and dust explosion r	protection (Ex ia + Ex d -							"	
Zone 1D/2D) <sup>#8)10)</sup>	,								
	fe (is)							F	
<ul> <li>FM + CSA intrinsic sa</li> </ul>									
• FM + CSA (is + ep) +	Ex ia + Ex d $(ATEX)^{10}$							S	
• FM + CSA (is + ep) + • With FM + CSA, Type	Ex ia + Ex d $(ATEX)^{10}$	7)						S N (	

Selection and Ordering data		Article No.		
Pressure transmitter for gauge pressure,		7 M F 4 0 3 3 -		
SITRANS P DS III with HART				
Electrical connection / cable entry				Ī
<ul> <li>Screwed gland Pg 13.5 (adapter)<sup>11)</sup></li> </ul>		A		
<ul> <li>Screwed gland M20 x1 .5</li> </ul>		В		
<ul> <li>Screwed gland ½-14 NPT</li> </ul>		C		
<ul> <li>Han 7D plug (plastic housing) incl. mating connector<sup>11</sup></li> </ul>		D		
<ul> <li>M12 connectors (stainless steel)<sup>11)12)</sup></li> </ul>		F		
Display				
<ul> <li>Without display</li> </ul>			0	
<ul> <li>Without visible display (display concealed, setting: mA)</li> </ul>	<b>&gt;</b>		1	
• With visible display (setting: mA)			6	
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>			7	

- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- 1) For oxygen application, add Order code E10.
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 3) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 4) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-.Y.-... and 7MF4900-1...-.B
- 5) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 6) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 7) Without cable gland, with blanking plug
- 8) With enclosed cable gland Ex ia and blanking plug
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- $^{11)}$ Only in connection with Ex approval A, B or E.
- <sup>12)</sup>M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge pressure

SITHANS F DS III I	or gauge pressure					
Selection and Ordering	g data	Artic	le No	Э.		
Pressure transmitter for	or gauge pressure					
SITRANS P DS III with P	ROFIBUS PA (PA)	7 M F	4 0	3 4	-	
SITRANS P DS III with F	OUNDATION Fieldbus (FF)	7 M F	4 0	3 5	-	
	lo. for the online configu- Cycle Portal.	П		-	T	1
Measuring cell filling	Measuring cell clean-					
Ciliagna ail	ing					
Silicone oil Inert liquid <sup>1)</sup>	normal grease-free to cleanliness level 2	3				
Nominal measuring ra	nge					
250 mbar	(3.6 psi)	Α				
1 bar	(14.5 psi)	В				
4 bar	(58 psi)	С				
16 bar	(232 psi)	D				
63 bar	(914 psi)	E F				
160 bar 400 bar	(2320 psi)	G				
700 bar	(5802 psi) (10153 psi)	J				
Wetted parts materials	1 /					
Seal diaphragm	Process connection					
Stainless steel	Stainless steel	4	١			
Hastelloy	Stainless steel	E	3			
Hastelloy	Hastelloy	C	;			
Version as diaphragm s	eal <sup>2) 3) 4) 5)</sup>	Y	<b>'</b>			
Process connection						
<ul> <li>Connection shank G½</li> </ul>			0			
<ul> <li>Female thread ½-14 N</li> </ul>			1			
Stainless steel oval fla	nge with process connec-					
tion (Oval flange has r	-20 UNF to IEC 61518		2			
<ul> <li>Mounting thread 716</li> <li>Mounting thread M1</li> </ul>			3			
<ul> <li>Mounting thread M1.</li> <li>Mounting thread M1.</li> </ul>			4			
Male thread M20 x 1.5			5			
• Male thread ½ -14 NP			6			
Non-wetted parts mate	erials					
• Housing made of die-	cast aluminium		0			
<ul> <li>Housing stainless stee</li> </ul>	el precision casting		3			
Version						
<ul> <li>Standard version, Ger</li> </ul>				1		
setting of pressure uni						
<ul> <li>International version, testing of pressure unit</li> </ul>	English label inscription,			2		
<ul> <li>Chinese version, English</li> </ul>				3		
setting of pressure uni				ľ		
All versions incl. DVD wit						
SITRANS P in German, E	inglish, French, Italian and					
EU languages.	operating instructions in 21					
Explosion protection						
None					Α	
With ATEX, Type of pro	otection:					
- "Intrinsic safety (Ex is					В	
- "Explosion-proof (Ex	d)" <sup>7)</sup>				D	
- "Intrinsic safety and	flameproof enclosure"				Р	
- "Intrinsic safety and (Ex ia + Ex d)" <sup>8)</sup>						
- "Ex nA/ic (Zone 2)"9)					E	
- "Intrinsic safety, expl	osion-proof enclosure and				R	
dust explosion prote Zone 1D/2D)**8)*10) (r	onor (Ex ia + Ex a +					
• FM + CSA intrinsic sat					F	
• FM + CSA (is + ep) +	, ,				s	
					3	
With FM + CSA, Type     "Intringia Safa and Free Company					N C	
- Intrinsic safe and E	xplosion Proof (is + xp)"7)				NC	

Selection and Ordering data	Article No.
Pressure transmitter for gauge pressure	
SITRANS P DS III with PROFIBUS PA (PA)	7 M F 4 0 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7 M F 4 0 3 5 -
Electrical connection/cable entry	
<ul> <li>Screwed gland M20 x 1.5</li> </ul>	В
• Screwed gland ½-14 NPT	C
<ul> <li>M12 connectors (stainless steel)<sup>11)12)</sup></li> </ul>	F
Display	
Without display	0
Without visible display (display concealed, setting: bar)	1
<ul> <li>With visible display (setting: bar)</li> </ul>	6
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" required)</li> </ul>	7

Included in delivery of the device:

- Brief instructions (Leporello)
  DVD with detailed documentation
- 1) For oxygen application, add Order code E10.
- 2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- $^{3)}$  If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 4) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-.Y.-.... and 7MF4900-1...-.B
- 5) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 6) M10 fastening thread: Max. span 160 bar (2320 psi) 7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- 7) Without cable gland, with blanking plug.
- 8) With enclosed cable gland Ex ia and blanking plug.
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- <sup>11)</sup>M12 delivered without cable socket.
- $^{12)}\mbox{Only}$  in connection with Ex approval A, B, E or F.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge pressure

Further designs Add '-Z' to Article No. and specify Order code.  Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x Uwasher or 1 x bracket, 2 x nut, 2 x Uwasher) made of:  Steel	Solootion and Ordering data		Order	oodo		
Add 'Z' to Article No. and specify Order code.  Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:  Steel	Selection and Ordering data		Order		DΛ	FF
bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:  Staiel  Stainless steel  Plug  Han 7D (metal)  Han 8D (instead of Han 7D)  A30  A31  A32  A34  A33  Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German)  English  English  B11  Cyrillic (russian)  B13  Cyrillic (russian)  B14  Cyrillic (russian)  B15  Rating plate inscription (instead of German)  English  B11  Cyrillic (russian)  B12  Cyrillic (russian)  B13  Cyrillic (russian)  B14  Cyrillic (russian)  B15  Cuality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate  Cac. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-3.1  Factory certificate  Cac. to EN 10204-3.1  Factory certificate  Chac. to EN 10204-3.1  Cyrillic (russian)  Cyrillic (russia	Add "-Z" to Article No. and specify Order			IIAIII		
• Steel • Stainless steel Plug • Han 7D (metal) • Han 8D (instead of Han 7D) • Angled • Han 8D (instead of Han 7D) • Angled • Han 8D (metal) • Aa32 • Han 8D (metal) • Aa33 • Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German) • English • English • Erench • Spanish • Italian	bracket (1x fixing angle, 2 x nut, 2 x U- washer or 1 x bracket, 2 x nut, 2 x U-					
Plug Han 7D (metal) Han 8D (instead of Han 7D) A31 A32 Angled A32 Angled A33 A33 Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German) English French F	• Steel		A01	✓	✓	✓
<ul> <li>Han 7D (metal)</li> <li>Han 8D (instead of Han 7D)</li> <li>A31</li> <li>✓</li> <li>Angled</li> <li>Han 8D (metal)</li> <li>A32</li> <li>✓</li> <li>Han 8D (metal)</li> <li>A33</li> <li>✓</li> <li>Cable sockets for M12 connectors (metal (CuZn))</li> <li>Rating plate inscription (instead of German)</li> <li>English</li> <li>B11</li> <li>✓</li> <li>✓</li> <li>French</li> <li>Spanish</li> <li>B13</li> <li>✓</li> <li>✓</li> <li>Spanish</li> <li>B13</li> <li>✓</li> <li>✓</li> <li>English rating plate</li> <li>English rating plate</li> <li>B16</li> <li>✓</li> <li>✓</li> <li>English rating plate</li> <li>B16</li> <li>✓</li> <li>✓</li> <li>English rating plate</li> <li>English rating plate</li> <li>B16</li> <li>✓</li> <li>✓</li> <li>C11</li> <li>✓</li> <li>✓&lt;</li></ul>			A02	✓	✓	✓
• Han 8D (instead of Han 7D) • Angled • Angled • Angled • Angled • Han 8D (metal)  Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German) • English • English • English • Spanish • Italian • Cyrillic (russian) • English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate <sup>2</sup> • C12 • Acc. to EN 10204-3.1 Factory certificate • Acc. to EN 10204-3.1 Factory certificate • Acc. to EN 10204-2.2  Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 615151. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 615151. Includes SIL conformity declaration  Functional safety (SIL2/3) Device passport Russia  C99  C23  Amanufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange  C1 item), PTEE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D  Cxygen application  (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C  (I40 °F))  Export approval Korea  CRN approval Canada	•		Δ30	1		
• Han 8D (metal)  Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German)  • English • French • Spanish • Italian • It	* *			✓		
Cable sockets for M12 connectors (metal (CuZn))  Rating plate inscription (instead of German)  • English  • English  • Erench  • Spanish  • Italian  • Cyrillic (russian)  English rating plate  Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate  Acc. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Device suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Device passport Russia  C99 ✓ ✓ ✓  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter "Infinity and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140°F))  Export approval Korea  CRN approval Canada	S .			✓.		
(metal (CuZn))       Rating plate inscription         (instead of German)       • English       • B11       ✓       ✓         • French       • B12       ✓       ✓       ✓         • Spanish       • B13       ✓       ✓       ✓         • Italian       • B14       ✓       ✓       ✓         • Lation       • B14       ✓       ✓       ✓         • Italian       • B16       ✓       ✓       ✓         • English rating plate       • C20       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓       ✓ <td>, ,</td> <td></td> <td></td> <td><b>V</b></td> <td></td> <td>,</td>	, ,			<b>V</b>		,
(instead of German)  English  English  French  Spanish  Italian  Italian  Cyrillic (russian)  English rating plate  Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2¹¹  Inspection certificate <sup>2</sup> Acc. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Device suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Purce passport Russia  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61508 and IEC 61511. Includes SIL conformity declaration  Dos  Setting of upper limit of output signal to IEC 61508 and IEC 61508 and IEC 61511. Includes SIL 61508 and IEC 61508 and IE			A50	•	•	<b>~</b>
• English • French • Spanish • Italian • Cyrillic (russian) • Bita • Cyrillic (russian) • Cita • Collic (allic (allic)) • Cita • Collic (allic) • Cita • Cyrillic (russian) • Cita • Collic (allic) • Cita • Cyrillic (russian) • Cita • Cyrillic (russia) • Cita						
• Spanish • Italian • Cyrillic (russian) English rating plate Pressure units in inH20 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-21 Inspection certificate² Acc. to EN 10204-3.1 Factory certificate Acc. to EN 10204-2.2 Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Functional safety (PROFIsafe) Certificate and PROFIsafe protocol Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter "MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140°F))  Export approval Korea  CRN approval Canada	,	•	B11	✓	1	1
• Italian • Cyrillic (russian) • Cyrillic (russian) • English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup> Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1  Factory certificate Acc. to EN 10204-2.2  Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4		•				
• Cyrillic (russian)  English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup> Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1  Factory certificate Acc. to EN 10204-2.2  Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Punctional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Setting of upper limit of output signal to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  C99  Setting of upper limit of output signal to IEC 61508 and IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Device passport Russia  C99  Setting of upper limit of output signal to IEC 61508 and IEC 61508 an	•	_				
English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup> Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1  Factory certificate Acc. to EN 10204-2.2  Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe) Certificate and PROFIsafe protocol  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Pevice passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection 'Intrinsic safety' (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application  (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada						
Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup> Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (Only for M20x1.5 and ½-14 NPT)  Supplied with oval flange  (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection 'Intrinsic safety' (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application  (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada					•	
factory calibration) to IEC 60770-21  Inspection certificate2  Acc. to EN 10204-3.1  Factory certificate  Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe)  Certificate and PROFIsafe protocol  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Devices passport Russia  Cegy   Cetting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4					•	·
Inspection certificate2) Acc. to EN 10204-3.1  Factory certificate Acc. to EN 10204-2.2  Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe) Certificate and PROFIsafe protocol  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange  (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4		•	C11	✓	✓	✓
Factory certificate  Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe) Certificate and PROFIsafe protocol  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter TMF4	Inspection certificate <sup>2)</sup>	•	C12	✓	✓	✓
Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe) Certificate and PROFIsafe protocol  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada			044	,	,	
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Functional safety (PROFIsafe) Certificate and PROFIsafe protocol  Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Cegy   Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada	-		C14	•	•	•
Certificate and PŘÒFIsafe protocol  Functional safety (SIL2/3)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Cegy	Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL	•	C20	✓		
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration  Device passport Russia  Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140°F))  Export approval Korea E11 ✓ ✓ ✓			C21 <sup>3)</sup>		✓	
Setting of upper limit of output signal to 22.0 mA  Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140°F))  Export approval Korea E11 ✓ ✓ ✓	Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL	•	C23	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea E11 ✓ ✓ ✓	Device passport Russia		C99	✓	✓	✓
(MR 0103-2012 and MR 0175-2009)  Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea E11 ✓ ✓ ✓ ✓ ✓ ✓ CRN approval Canada			D05	✓		
(only for M20x1.5 and ½-14 NPT)  Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada			D07	✓	✓	✓
(1 item), PTFE packing and screws in thread of oval flange  Capri cable gland 4F CrNi and clamping device (848699 + 810634) included  Use in or on zone 1D/2D  (only together with type of protection "Intrinsic safety" (transmitter 7MF4B. Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada  D59  ✓ ✓ ✓  E01  ✓ ✓ ✓  FE10  ✓ ✓ ✓			D12	✓	✓	✓
device (848699 + 810634) included  Use in or on zone 1D/2D  (only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada  E01   ✓ ✓ ✓  E10   ✓ ✓ ✓			D37	✓	✓	✓
(only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP66)  Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  CRN approval Canada  E11			D59	✓	✓	✓
(In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))  Export approval Korea  E11	(only together with type of protection "Intrinsic safety" (transmitter		E01	✓	<b>✓</b>	✓
CRN approval Canada E22 ✓ ✓ ✓	(In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C		E10	✓	✓	✓
	Export approval Korea		E11	✓	✓	✓
(() and a discussion of the di	CRN approval Canada (Canadian Registration Number)		E22	✓	1	1

Selection and Ordering data Order code					
Further designs Add "-2" to Article No. and specify Order code.		HART	PA	FF	
Dual seal	E24	✓	✓	✓	
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil)	E25 <sup>4)</sup>	✓	✓	✓	
(only for transmitter 7MF4B)	4)				
"Flameproof" explosion protection according to INMETRO (Brazil)	E26 <sup>4)</sup>	<b>✓</b>	✓	<b>√</b>	
(only for transmitter 7MF4D)  Explosion-proof "Intrinsic safety" (Ex ia	E28 <sup>4)</sup>	✓	✓		
+ Ex d) to INMETRO (Brazil) (only for transmitter 7MF4P)					
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4B)	E45 <sup>4)</sup>	✓	✓	✓	
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4D)	E46 <sup>4)</sup>	✓	✓	✓	
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>4)</sup>	✓	✓	✓	
(only for transmitter 7MF4B)					
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>4)</sup>	✓	✓	✓	
(only for transmitter 7MF4D)  Ex protection "Zone 2" to NEPSI (China)	E57 <sup>4)</sup>	1	./	1	
(only for transmitter 7MF4E)	LSI	Ĭ	•	•	
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>4)</sup>	✓	✓	✓	
(only for transmitter 7MF4R)  "Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)	E70 <sup>4)</sup>	✓	✓	✓	
(only for transmitter 7MF4[B, D]Z + E11)					
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>5)</sup>	✓	✓	✓	
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>5)</sup>	✓	✓	✓	
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>5)</sup>	✓	✓	✓	
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>5)</sup>	✓	✓	✓	
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓	
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓	
Oval flange NAM (ASTAVA)	J06	✓	✓	<b>√</b>	

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
- 4) Option does not include ATEX approval, but instead includes only the country-specific approval.
- 5) Approval pending.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge pressure

Selection and Ordering data	Order	code		
	Order		DA	ГГ
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set	Y01	✓	<b>√</b> 1)	
Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi				
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text:	Y15	✓	✓	✓
Y15:				
	Y16	✓	✓	✓
Max. 27 characters, specify in plain text: Y16:				
Entry of HART address (TAG)	Y17	✓		
Max. 8 characters, specify in plain text: Y17:				
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
The following pressure units can be selected:				
bar, mbar, mm $H_2O^*$ ), $inH_2O^*$ ), $ftH_2O^*$ ), mmHG, $inHG$ , $psi$ , $Pa$ , $kPa$ , $MPa$ , $g/cm^2$ , $kg/cm^2$ , $Torr$ , $ATM$ or $\%$				
	Y22 +	✓		
non-pressure units <sup>2</sup> ) Specify in plain text: Y22: up to I/min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y01			
Preset bus address	Y25		1	1
possible between 1 and 126 Specify in plain text: Y25:				
Damping adjustment in seconds (0 100 s)	Y30	1	1	✓

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

#### Ordering example

7MF4033-1EA00-1AA7-Z Item line:

A01 + Y01 + Y21 B line:

C line: Y01: 10 ... 20 bar (145 ... 290 psi)

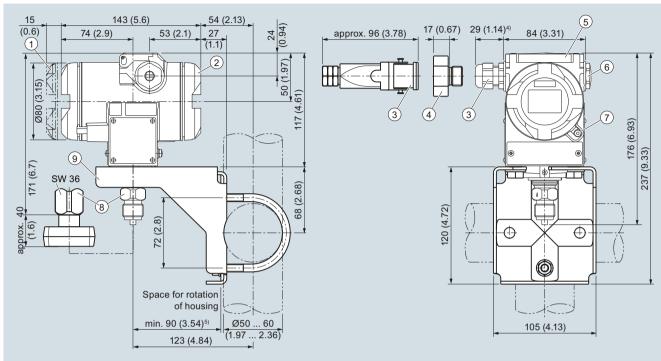
Y21: bar (psi) C line:

Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
 Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge pressure

### Dimensional drawings



- 1 Electronic side, digital display (longer overall length for cover with window)1)
- 2 Terminal side<sup>1)</sup>
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)2)3), Screwed gland M20 x 1,5 or Screwed gland 1/2-14 NPT or Han 7D/Han 8D2)3)plug
- 4 Harting adapter
- Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
   Not with type of protection "Explosion-proof enclosure"
- Not with type of protection "FM + CSA" [IS + XP]"
- For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- 5) Minimum distance for rotating

- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Process connection: Connection shank G1/2B or Oval flange
- (9) Mounting bracket (option)

SITRANS P DS III pressure transmitters for gauge pressure, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

### Technical specifications

Technical specifications						
SITRANS P DS III series for gauge and absolute pressure, v	vith front-flush diapl	hragm				
Input of gauge pressure, with front-flush diaphragm						
Measured variable	Gauge pressure, fro	nt-flush				
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus				
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure		
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi)		
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi		
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi		
	0.63 63 bar 63 6300 kPa 9.1 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7MPa 972 psi	100 bar 10 MPa 1450 psi		
Lower measuring limit						
Measuring cell with silicone oil filling	100 mbar a/10 kPa/1	1.45 psia				
Measuring cell with inert filling liquid	100 mbar a/10 kPa/1	1.45 psia				
Measuring cell with Neobee	100 mbar a/10 kPa/1	1.45 psia				
Upper measuring limit	100 % of max. span					
Input of absolute pressure, with front-flush diaphragm						
Measured variable	Absolute pressure, f	ront-flush				
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus				
	Span 43 1300 mbar a	Nominal measuring range 1300 mbar a	Max. operating pressure MAWP (PS) 2.6 bar a	Max. perm. test pressure 10 bar a		
	4.3 130 kPa a 17 525 inH <sub>2</sub> O a	130 kPa a 525 inH <sub>2</sub> O a	260 kPa a 37.7 psi	1 MPa a 145 psi		
	160 5000 mbar a 16 500 kPa a 2.32 72.5 psia	5000 mbar a 500 kPa a 72.5 psia	10 bar a 1 MPa a 145 psia	30 bar a 3 MPa a 435 psia		
	1 30 bar a 0.1 3 MPa a 14.5 435 psia	30 bar a 3 MPa a 435 psia	45 bar a 4.5 MPa a 653 psia	100 bar a 10 MPa a 1450 psia		
	Depending on the p	rocess connection, th	e span may differ from	m these values		
Lower measuring limit	0 mbar a/0 kPa a/0 p	osia				
Upper measuring limit	100 % of max. span					
Output	HART		PROFIBUS PA/FOU	NDATION Fieldbus		
Output signal	4 20 mA		Digital PROFIBUS PA	A and FOUNDATION		
Lower limit (infinitely adjustable)	3.55 mA, factory pre	set to 3.84 mA	-			
Upper limit (infinitely adjustable)  Load	23 mA, factory prese optionally set to 22.0		-			
	D 4/11 40 5 10/0	000 A to 0				
Without HART	$R_{\rm B} \le (U_{\rm H} - 10.5 \text{ V})/0.$ $U_{\rm H}$ : Power supply in	V	-			
With HART	$R_{\rm B} = 230 \dots 500 \Omega \text{ (s} \\ R_{\rm B} = 230 \dots 1100 \Omega \text{ (sr)}$					
Physical bus	-		IEC 61158-2			
Protection against polarity reversal	Protected against shother with max. supp	nort-circuit and polarit oly voltage.	y reversal. Each conr	nection against the		
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	3)				

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

#### SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm Acc. to IEC 60770-1 Measuring accuracy Reference conditions • Increasing characteristic Start-of-scale value 0 bar/kPa/psi (All error data refer always refer to the set span) Stainless steel seal diaphragm · Silicone oil filling Room temperature 25 °C (77 °F) Measuring span ratio r (spread, Turn-Down) r = max. measuring span/set measuring span or nom. pressure range Error in measurement at limit setting incl. hysteresis and reproducibility · Linear characteristic Gauge pressure, front-flush Absolute pressure, front-flush ≤ 0.075 % - r < 5 $-5 < r \le 100$ $\leq$ (0.005 · r + 0.05) % - r ≤ 10 ≤ 0.2 % $-10 < r \le 30$ < 0.4 % Influence of ambient temperature $\leq$ (0.08 · r + 0.16) % $\leq$ (0.16 · r + 0.24) % (in percent per 28 °C (50 °F)) Effect of ambient temperature (in pressure per temperature change) • Temperature difference between medium 3 mbar/0.3 kPa/0.04 psi per 10 K temperature and ambient temperature Long-term stability (temperature change ± 30 °C (± 54 °F)) ≤ (0.25 · r) % in 5 years Effect of mounting position (in pressure per change in angle) 0.4 mbar/0.04 kPa/0.006 per 10° inclination (zero point correction is possible with position error compensation) 0.005 % per 1 V Effect of auxiliary power supply (in percent per change in voltage) Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus 3 · 10<sup>-5</sup> of nominal measuring range **Rated conditions** Installation conditions Ambient temperature Observe the temperature class in areas subject to explosion hazard. Measuring cell with silicone oil -40 ... +85 °C (-40 ... +185 °F) • Measuring cell with Neobee oil (with front-flush diaphragm) -10 ... +85 °C (14 ... +185 °F) · Measuring cell with inert liquid (not with front-flush dia--20 ... +85 °C (-4 ... +185 °F) phragm) • Transmitter (with 4-wire connection, observe temperature val- -40 ... +85 °C (-40 ... +185 °F) ues of supplementary 4-wire electronics) Display readable -30 ... +85 °C (-22 ... +185 °F) Storage temperature -50 ... +85 °C (-58 ... +185 °F) (in the case of Neobee: -20 ... +85 °C (-4 ... +185/°F)) (for high temperature oil: -10 ... + 85 °C (14 ... 185 °F)) Climatic class Condensation Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics Degree of protection (to IEC 60529) IP66 (optional IP66/IP68), NEMA 4X Electromagnetic Compatibility • Emitted interference and interference immunity Acc. to IEC 61326 and NAMUR NE 21 Medium conditions The max, medium temperature of the front-flush process connections is to be taken into account in accordance with the relevant connection standards (e. g. DIN 32676. DIN 11851 etc.). Temperature of medium · Measuring cell with silicone oil -40 ... +100 °C (-40 ... +212 °F) Measuring cell with silicone oil (with front-flush diaphragm) -40 ... +150 °C (-40 ... +302 °F) • Measuring cell with Neobee oil (with front-flush diaphragm) -10 ... +150 °C (14 ... 302 °F) · Measuring cell with silicone oil, with temperature decoupler -40 ... +200 °C (-40 ... +392 °F) (only for gauge pressure version with front-flush diaphragm) Measuring cell with Neobee oil, with temp. decoupler (only for -10 ... +200 °C (14 ... 392 °F)

-20 ... +100 °C (-4 ... +212 °F)

gauge pressure version with flush-mounted diaphragm)

Measuring cell with high-temperature oil (only for gauge pres- -10 ... +250 °C (14 ... 482 °F)

· Measuring cell with inert filling liquid

sure version with front-flush diaphragm)

Fault disconnection electronics (FDE) available

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

SITRANS P DS III series for gauge and absolute	pressure, with front-flush diaphragm				
Design					
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)				
Enclosure material	Low-copper die-cast aluminum, GD-no. 1.4408	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. $1.4408$			
Wetted parts materials	Stainless steel, mat. no. 1.4404/316L	or Hastelloy C276, mat. no. 2.4819			
Measuring cell filling	Silicone oil or inert filling liquid				
Process connection	<ul> <li>Flanges as per EN and ASME</li> </ul>				
	<ul> <li>F&amp;B and pharmaceutical flanges</li> </ul>				
Surface quality touched-by-media	$ m R_a$ -values $\leq$ 0.8 $\mu$ m (32 $\mu$ -inch)/weld: (Process connections acc. to 3A; $ m R_a$ (32 $\mu$ -inch)	s $R_{a)} \le 1.6$ µm (64 µ-inch) -values $\le 0.8$ µm (32 µ-inch)/welds $R_a$ ) $\le 0.8$ µm			
Power supply U <sub>H</sub>	HART	PROFIBUS PA/FOUNDATION Fieldbus			
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe r	node -			
Power supply	-	Supplied through bus			
Separate 24 V power supply necessary	-	No			
Bus voltage					
• Not Ex	-	9 32 V			
With intrinsically-safe operation	-	9 24 V			
Current consumption					
Basic current (max.)	-	12.5 mA			
• Start-up current ≤ basic current	-	Yes			
Max. current in event of fault	-	15.5 mA			

Yes

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm					
Certificates and approvals					
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)				
Explosion protection					
• Intrinsic safety "i"	PTB 13 ATEX 2007 X				
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb				
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatur -40 +70 °C (-40 +158 °F) temperatur -40 +60 °C (-40 +140 °F) temperatur	e class T5;			
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 250 \text{ mA}$ , $P_0 = 1.2 \text{ W}$			
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{\rm i} = 7  \mu \text{H},  C_{\rm i} = 1.1  \text{nF}$			
• Explosion-proof "d"	PTB 99 ATEX 1160				
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb				
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatur -40 +60 °C (-40 +140 °F) temperatur				
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC	To circuits with values: $U_{H} = 9 \dots 32 \text{ V DC}$			
Dust explosion protection for zone 20	PTB 01 ATEX 2055				
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db				
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)				
- Max. surface temperature	120 °C (248 °F)				
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 250 \text{ mA}$ , $P_0 = 1 \text{ W}$			
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$			
• Dust explosion protection for zone 21/22	Ex II 2 D Ex tb IIIC T120°C Db				
- Marking	Ex II 2 D IP65 T 120 °C				
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC; $P_{\rm max}$ = 1.2 W	To circuits with values: $U_{\rm H}$ = 9 32 V DC; $P_{\rm max}$ = 1 W			
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X				
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc				
- Connection (Ex nA)	<i>U</i> <sub>m</sub> = 45 V	<i>U</i> <sub>m</sub> = 32 V			
- Connections (Ex ic)	To circuits with values: $U_{\rm i} = 45~{\rm V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V, } I_0 = 570 \text{ mA}$			
		Linear barrier: $U_0 = 32 \text{ V}, I_0 = 132 \text{ mA}, P_0 = 1 \text{ W}$			
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH}, \; C_{\rm i} = 6  {\rm nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 \text{ nF}$			
Explosion protection acc. to FM	Certificate of Compliance 3008490				
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III				
• Explosion protection to CSA	Certificate of Compliance 1153651				
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV 2, GP FG; CL III				

#### Hygiene version

In the case of SITRANS P DSIII with 7MF413x front-flush diaphragm, selected connections comply with the requirements of EHEDG.

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for gauge/a	absolute pressure, with front	t-flush diaphragm	
HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	
PROFIBUS PA communication		- Adaptation to customer-specif-	Yes, linearly rising or falling
Simultaneous communication with master class 2 (max.)	4	ic process variables	characteristic
The address can be set using	Configuration tool or local	- Electrical damping, adjustable	0 100 s
The address can be set using	operation (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Failure mode	parameterizable (last good value, substitute value, incorrect
<ul> <li>Output byte</li> </ul>	5 (one measured value) or 10 (two measured values)		value)
• Input byte	0, 1, or 2 (register operating mode and reset function for	- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively
Internal preprocessing	metering)	<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Standard FOUNDATION Fieldbus function block
	3.0, class B	Physical block	1 resource block
Function blocks	2	Transducer blocks	1 transducer block Pressure with
Analog input			calibration, 1 transducer block LCD
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	<ul> <li>Simulation function: Measured pressure value, sensor temper-</li> </ul>	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electronics tempera- ture	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
<ul> <li>Physical block</li> </ul>	1		
Transducer blocks	2		
Pressure transducer block			
<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes		
- Monitoring of sensor limits	Yes		

- Specification of a container

Square-rooted characteristic for flow measurement - Gradual volume suppression

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

characteristic with

sor temperature

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Selection and Ordering	ng data	Article	e No.
Pressure transmitter	for gauge and absolute	7 M F	4133-
pressure, front-flush SITRANS P DS III HAI	аарпгадт, RT		
	No. for the online configu- e Cycle Portal.		
Measuring cell filling	•		
Silicone oil	normal	1	
Inert liquid	grease-free to cleanliness level 2	3	
FDA compliant fill fluid			
Neobee oil	normal	4	
Measuring span (min	max.)		
0.01 1 bar	(0.15 14.5 psi)	В	
0.04 4 bar	(0.58 58 psi)	С	
0.16 16 bar	(2.32 232 psi)	D	
0.63 63 bar	(9.14 914 psi)	E	
43 1300 mbar a <sup>1)</sup>	(0.62 18.85 psia) <sup>1)</sup>	S	
0.16 5 bar a <sup>1)</sup>	(0.7 72.5 psia) <sup>1)</sup>	T	
1 30 bar a <sup>1)</sup>	(4.35 435 psia) <sup>1)</sup>	U	
Wetted parts material			
Seal diaphragm	Connection shank		
Stainless steel	Stainless steel	A	
Hastelloy <sup>2)</sup>	Stainless steel	В	
Process connection			
	rder code M, N, R or Q	_	7
Non wattad narta mai	toriala		
Non-wetted parts ma			
<ul> <li>Housing made of die</li> </ul>	-cast aluminium		0
<ul><li>Housing made of die</li><li>Housing stainless ste</li></ul>	-cast aluminium		
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> </ul> Version	-cast aluminium	-	
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> <li>Version</li> <li>Standard version, Ge setting for pressure u</li> </ul>	e-cast aluminium pel precision casting erman plate inscription, unit: bar	-	3
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> </ul> Version <ul> <li>Standard version, Gesetting for pressure use</li> <li>International version,</li> </ul>	e-cast aluminium pel precision casting erman plate inscription, unit: bar English plate inscription,	_	3
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> <li>Version</li> <li>Standard version, Gesetting for pressure use</li> <li>International version, setting for pressure use</li> </ul>	e-cast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar		1 2
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> </ul> Version <ul> <li>Standard version, Gesetting for pressure use</li> <li>International version,</li> </ul>	e-cast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription,		1
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> <li>Version</li> <li>Standard version, Gesetting for pressure use</li> <li>International version, setting for pressure use</li> <li>Chinese version, Englisetting for pressure ure All versions include DVI</li> </ul>	e-cast aluminium eel precision casting erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, it: Pascal D with documentation for		1 2
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> <li>Version</li> <li>Standard version, Gesetting for pressure usetting for pressure usett</li></ul>	e-cast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and		1 2
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure Lenders for pressure L	e-cast aluminium eel precision casting erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, it: Pascal D with documentation for		1 2
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use International version, setting for pressure use Chinese version, Englisetting for pressure ure All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.	e-cast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions		1 2
<ul> <li>Housing made of die</li> <li>Housing stainless ste</li> <li>Version</li> <li>Standard version, Gesetting for pressure use</li> <li>International version, setting for pressure use</li> <li>Chinese version, Englisetting for pressure ure ure versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.</li> </ul>	e-cast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions		1 2
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure ue International version, setting for pressure ue Chinese version, Englisetting for pressure ue All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of p	e-cast aluminium elel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions		3 1 2 3
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure ue International version, setting for pressure ue Chinese version, Engisetting for pressure under versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of publication.	e-cast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)"		3 1 2 3
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure ue International version, setting for pressure ue Chinese version, Engisetting for pressure urseling for p	e-cast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3)		3 1 2 3 3 A B D
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure ue International version, setting for pressure ue Chinese version, Engisetting for pressure ue Chinese version, Engisetting for pressure ue Universions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of perintrinsic safety (Exert in the standard in the safety (Exert in the safety)  With ATEX, Type of perintrinsic safety (Exert in the safety)  "Explosion-proof (Eere in the safety)  "Explosion-proof (E	e-cast aluminium elel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4)		3 1 2 3 3 A B D E
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use the line of the li	e-cast aluminium eel precision casting  erman plate inscription, unit: bar  English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is)		3 1 2 3 3 A B D E F
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure Le Chinese version, Englisetting for pressure use the version of	e-cast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup>		3 1 2 3 3 A B D E
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use. International version, setting for pressure use. Chinese version, Englisetting for pressure use. International versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of perman, "Explosion-proof (Eegles)" (Explosion-proof (Eegles)"	e-cast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup>		3 1 2 3 A B D E F S
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use. International version, setting for pressure use. Chinese version, English setting for pressure use. All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of particular properties after (Explosion-proof (Early Explosion-proof (Early Explosio	ercast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup> e of protection: Explosion Proof (is + xp)"3)		3 1 2 3 3 A B D E F
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use. International version, setting for pressure use. Chinese version, English setting for pressure use. All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of parantinisic safety (Examples of Explosion-proof (Early Expl	e-cast aluminium elel precision casting  erman plate inscription, unit: bar  English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  errotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup> e of protection: Explosion Proof (is + xp)" <sup>3)</sup> e/cable entry		3 1 2 3 3 A B D E F S S NC
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use. International version, setting for pressure use. Chinese version, English setting for pressure use. All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of particular properties after (Explosion-proof (Early Explosion-proof (Early Explosio	ercast aluminium pel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  erctection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup> e of protection: Explosion Proof (is + xp)" <sup>3)</sup> //cable entry .5		3 1 2 3 A B D E F S
Housing made of die Housing stainless ste Version Standard version, Ge setting for pressure use. International version, setting for pressure use. Chinese version, Englisetting for pressure use. All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of particular elements. Type of particu	e-cast aluminium elel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, nit: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup> e of protection: Explosion Proof (is + xp)" <sup>3)</sup> r/cable entry .5 NPT		3 1 2 3 3 A B D E F S NC B
Housing made of die Housing stainless ste Version Standard version, Gesetting for pressure use. International version, setting for pressure use. Chinese version, English setting for pressure use. All versions include DVI SITRANS P in German, Spanish. Includes Comin 21 EU languages.  Explosion protection None With ATEX, Type of particular properties after the companion of the c	ercast aluminium eel precision casting  erman plate inscription, unit: bar English plate inscription, unit: bar lish plate inscription, it: Pascal D with documentation for English, French, Italian and pact operating instructions  rotection: ia)" x d)" 3) 4) afe (is) + Ex ia + Ex d (ATEX) <sup>5)</sup> e of protection: Explosion Proof (is + xp)"3)  //cable entry .5 NPT housing) incl. mating		3 1 2 3 3 A B D E F S NC

Selection and Ordering data	Article No.
Pressure transmitter for gauge and absolute	7MF4133-
pressure, front-flush diaphragm, SITRANS P DS III HART	
Display	
Without display	0
<ul> <li>Without visible display</li> </ul>	1
(display concealed, setting: mA)	
<ul> <li>With visible display (setting: mA)</li> </ul>	6
With customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
  DVD with detailed documentation
- 1) Not with temperature decoupler P00 and P10, not for process connections R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
- $^{2)}\,$  Only available for flanges with options M.., N.. and Q..
- 3) Without cable gland, with blanking plug
- $^{\rm 4)}$  Configurations with HAN and M12 connectors are only available in Ex ic.
- 5) Only in connection with IP66.
- <sup>6)</sup> Only in connection with Ex approval A, B or E.
- $^{7)}\,$  Only in connection with Ex approval A, B, E or F.
- 8) M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Selection and Orderin	g data	Artic	le N	Ю.	
Pressure transmitter I pressure, front-flush	P for gauge and absolute diaphragm:				
SITRANS P DS III with F	PROFIBUS PA (PA)	7 M I	F 4 1	3 4	
SITRANS P DS III with F	OUNDATION Fieldbus (FF)	7MF4135-			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			П		
Measuring cell filling	Measuring cell clean-				
Silicone oil	normal	1			
Inert liquid	grease-free to cleanliness level 2	3			
FDA compliant fill fluid • Neobee oil	normal	4			
Nominal measuring ra	inge				
1 bar	(14.5 psi)	В			
4 bar	(58 psi)	С			
16 bar	(232 psi)	D			
63 bar	(914 psi)	E			
1300 mbar a <sup>1)</sup> 5 bar a <sup>1)</sup>	(18.85 psia) <sup>1)</sup>	S			
5 bar a '/ 30 bar a <sup>1)</sup>	(72.5 psia) <sup>1)</sup> (435 psia) <sup>1)</sup>	Ţ			
	, , ,	U			
Wetted parts materials Seal diaphragm	S Connection shank				
Stainless steel	Stainless steel	-	4		
Hastelloy <sup>2)</sup>	Stainless steel	E	3		
Q  Non-wetted parts mat  • Housing made of die- • Housing stainless ste	-cast aluminium		0 3		
	er precision casting	-	٥		
<ul> <li>setting for pressure u</li> <li>Chinese version, Engli setting for pressure un All versions include DVE SITRANS P in German, I Spanish. Includes Comp in 21 EU languages.</li> </ul>	nit: bar English plate inscription, nit: bar sh plate inscription, it: Pascal			3	
<ul><li>Explosion protection</li><li>None</li></ul>					Α
<ul> <li>With ATEX, Type of pr</li> <li>"Intrinsic safety (Ex</li> <li>"Explosion-proof (Ex</li> <li>"Ex nA/ic (Zone 2)"</li> <li>FM + CSA intrinsic sa</li> <li>FM + CSA (is + ep) +</li> <li>With FM + CSA, Type</li> </ul>	ia)" ( d)" <sup>3)</sup> i) Ife (is) Ex ia + Ex d (ATEX) <sup>5)</sup>				B D E F S
• Screwed gland ½-14 • M12 connectors (stair	< 1.5 NPT				B C F

0.1 10.1 . 1.	A .: 1 B1
Selection and Ordering data	Article No.
Pressure transmitter P for gauge and absolute pressure, front-flush diaphragm:	
SITRANS P DS III with PROFIBUS PA (PA)	7 M F 4 1 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7 M F 4 1 3 5 -
Display	
Without display	0
Without visible display	1
(display concealed, setting: bar)	
<ul> <li>With visible display (setting: bar)</li> </ul>	6
With customer-specific display (setting as specified, Order code "Y21" required)	7

Included in delivery of the device:

- Brief instructions (Leporello)
  DVD with detailed documentation
- 1) Not with temperature decoupler P00 and P10, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
- $^{2)}\,$  Only available for flanges with options M.., N.. and Q..
- 3) Without cable gland, with blanking plug
- $^{\rm 4)}$  Configurations with HAN and M12 connectors are only available in Ex ic.
- 5) Only in connection with IP66.
- $^{6)}\,$  Only in connection with Ex approval A, B, E or F.
- 7) M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code		HART	PA	F
Plug				
Han 7D (metal)	A30	✓		
<ul> <li>Han 8D (instead of Han 7D)</li> </ul>	A31	✓		
Angled	A32	✓		
Han 8D (metal)	A33	✓		
Cable sockets for M12 connectors (metal (CuZn))	A50	✓	✓	
Rating plate inscription (instead of German	1)			
• English	B11	✓	✓	
• French	B12	✓	✓	
Spanish	B13	✓	✓	
Italian	B14	✓	✓	
Cyrillic (russian)	B16	✓	✓	•
English rating plate	B21	✓	✓	
Pressure units in inH <sub>2</sub> 0 and/or psi				
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	✓	•
Inspection certificate	C12	✓	✓	
Acc. to EN 10204-3.1				
Factory certificate	C14	✓	✓	
Acc. to EN 10204-2.2				
Functional safety (SIL2)	C20	✓		
Devices suitable for use according to				
IEC 61508 and IEC 61511. Includes SIL conformity declaration				
Functional safety (PROFIsafe)	C21 <sup>1)</sup>		1	
Certificate and PROFIsafe protocol	021		·	
Functional safety (SIL2/3)	C23	✓		
Devices suitable for use according to				
IEC 61508 and IEC 61511. Includes SIL conformity declaration	-			
Device passport Russia	C99	✓	1	
Setting of upper limit of output signal to	D05	✓		
22.0 mA				
Degree of protection IP66/IP68	D12	✓	✓	
(only for M20x1.5 and ½-14 NPT)				
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	
Oxygen application	E10	✓	✓	
(In the case of oxygen measurement and inert				
liquid max. 100 bar (1450 psi) at 60°C (140 °F)	)			
Export approval Korea	E11	✓	✓	
CRN approval Canada	E22	1	1	
(Canadian Registration Number)				
Dual seal	E24	✓	✓	
Explosion-proof "Intrinsic safety" (Ex ia) to	E25 <sup>2)</sup>	1	1	
INMETRO (Brazil)				
(only for transmitter 7MF4B)				
"Flameproof" explosion protection accord	- F26 <sup>2</sup> )	1	1	
ing to INMETRO (Brazil)				
(only for transmitter 7MF4D)				
Explosion-proof "Intrinsic safety" (Ex ia +	E28 <sup>2)</sup>	✓	✓	
Ex d) to INMETRO (Brazil)				
(only for transmitter 7MF4P)				
· · · · · · · · · · · · · · · · · · ·	E45 <sup>2)</sup>	✓	✓	
,				
Ex Approval IEC Ex (Ex ia)				
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4B) Ex Approval IEC Ex (Ex d)	E46 <sup>2)</sup>	✓	✓	

	0 1		•	
Selection and Ordering data	Order	code HART	DA	
Further designs Add "-Z" to Article No. and specify Order code.		ПАКІ	PA	FF
Explosion-proof "Intrinsic safety" to NEPSI	E55 <sup>2)</sup>	✓	✓	1
(China) (only for transmitter 7MF4B)				
Explosion protection "Explosion-proof" to	E56 <sup>2)</sup>	1	1	1
NEPSI (China)				
(only for transmitter 7MF4D)	3)			
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4E)	E57 <sup>2)</sup>	<b>V</b>	✓	<b>V</b>
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>2)</sup>	✓	✓	✓
(only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)	E70 <sup>2)</sup>	✓	✓	✓
(only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex	E80 <sup>3)</sup>	✓	✓	✓
(Russia)  Ex-protection Ex d according to EAC Ex	E81 <sup>3)</sup>	1	✓	<b>✓</b>
(Russia)				
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>3)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>3)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	1	✓	✓
Flanges to EN 1092-1, Form B1				
• DN 25, PN 40 <sup>4</sup> )	M11	<b>✓</b>	1	1
<ul> <li>DN 25, PN 100<sup>4)</sup></li> <li>DN 40, PN 40</li> </ul>	M21 M13	1	<b>✓</b>	1
• DN 40, PN 100	M23	1	1	1
• DN 50, PN 16	M04	1	1	1
• DN 50, PN 40	M14	✓	✓	✓
• DN 80, PN 16	M06	✓	✓	✓
• DN 80, PN 40	M16	✓	✓	✓
Flanges to ASME B16.5				
<ul> <li>Stainless steel flange 1" class 150<sup>4)</sup></li> </ul>	M40	✓	✓	✓
• Stainless steel flange 1½" class 150	M41	<b>✓</b>	✓.	<b>✓</b>
Stainless steel flange 2" class 150	M42	<b>1</b>	1	1
<ul> <li>Stainless steel flange 3" class 150</li> <li>Stainless steel flange 4" class 150</li> </ul>	M43	1	<b>✓</b>	1
• Stainless steel flange 4 class 150 • Stainless steel flange 1" class 300 <sup>4)</sup>	M44 M45	<b>✓</b>	<b>∀</b>	<b>V</b>
• Stainless steel flange 1½" class 300	M46	1	1	1
Stainless steel flange 2" class 300     Stainless steel flange 2" class 300	M47	1	1	1
• Stainless steel flange 3" class 300	M48	1	1	1
Stainless steel flange 4" class 300	M49	✓	✓	✓
Threaded connector to DIN 3852-2,				
form A, thread to ISO 228 <sup>5)</sup>	Do:			
• G 3/4"-A, front-flush	R01	1	1	1
<ul><li>G 1"-A, front-flush</li><li>G 2"-A, front-flush</li></ul>	R02 R04	1	1	1
	1104		•	•
<b>Tank connection<sup>6)</sup></b> Sealing is included in delivery				
• TG 52/50, PN 40	R10	1	1	1
• TG 52/150, PN 40	R11	1	1	1

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

## Further designs   Add "2" to Article No. and specify Order code.   Add "2" to Article No. and specify Order code.   Sanitary process connection according   DIN 11851 (Dairy connection with slotted union mut)	Selection and Ordering data	Order	code		
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut)			HART	PA	FF
DIN 11851 (Dairy connection with slotted union nut)					
• DN 50, PN 25 • DN 80, PN 25 • DN 80, PN 25  Tri-Clamp connection according DIN 32676/ISO 2852 • DN 50/2°, PN 16 • DN 65/3°, PN 10  Varivent connection Certified to EHEDG • Type N = 68 for Varivent housing DN 40 125 and 1½° 6°, PN 40  Temperature decoupler up to 200 °C7) for version with front-flush diaphragm  Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling: silicone oil  Sanitary process connection to DRD • DN 50, PN 40  SMS socket with union nut • 2° • 2½° • 3°  SMS threaded socket • 2° • 2½° • 3°  IDF socket with union nut ISO 2853 • 2° • 2½° • 3°  IDF socket with union nut ISO 2853 • 2° • 2½° • 3°  Sanitary process connection to Neture Silicone Sili	DIN 11851 (Dairy connection with slotted				
• DN 80, PN 25  Tri-Clamp connection according DIN 32676/ISO 2852 • DN 50/2*, PN 16 • DN 65/3*, PN 10  Varivent connection Certified to EHEDG • Type N = 68 for Varivent housing DN 40 125 and 1½* 6*, PN 40  Temperature decoupler up to 200 °C7 for version with front-flush diaphragm  Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling sliicone oil  Sanitary process connection to DRD • DN 50, PN 40  SMS socket with union nut • 2"	•	N04	1	1	1
DIN 32676/ISO 2852	•	N06	✓	✓	✓
• DN 50/2", PN 16 • DN 65/3", PN 10  Varivent connection Certified to EHEDG • Type N = 68 for Varivent housing DN 40 125 and 1½" 6", PN 40  Temperature decoupler up to 200 °C7 for version with front-flush diaphragm  Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil  Sanitary process connection to DRD • DN 50, PN 40  SMS socket with union nut • 2"  SMS socket with union nut • 2"  SMS threaded socket • 2"  M73  M74  ✓ ✓ ✓  M75  M75  M77  M77  M78  M88  M89  M89  M89  M89					
Varivent connection           Certified to EHEDG         • Type N = 68 for Varivent housing DN 40 125 and 1½" 6", PN 40         N28         ✓         ✓           Temperature decoupler up to 200 °C7 for version with front-flush diaphragm         P00         ✓         ✓           Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil         P10         ✓         ✓           Sanitary process connection to DRD         ND 50, PN 40         M32         ✓         ✓           SmS socket with union nut         • 2"         M67         ✓         ✓           • 2½"         M68         ✓         ✓         ✓           • 3"         M69         ✓         ✓         ✓           • 2½"         M68         ✓         ✓         ✓           • 2½"         M73         ✓	• DN 50/2", PN 16	N14	✓	✓	✓
Certified to EHEDG  • Type N = 68 for Varivent housing DN 40 125 and 1½" 6", PN 40  Temperature decoupler up to 200 °C <sup>7)</sup> for version with front-flush diaphragm  Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil  Sanitary process connection to DRD • DN 50, PN 40  SMS socket with union nut  • 2"  • 2½"  • 3"  M68		N15	✓	✓	✓
Temperature decoupler up to 200 °C7					
Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil  Sanitary process connection to DRD  • DN 50, PN 40  SMS socket with union nut  • 2"  • 2½"  M68  • 3"  M69  • 3"  M69  • 2½"  M73  • 2½"  M74  • 2½"  M75  SMS threaded socket  • 2"  • 2½"  M74  • 2½"  M75   * 2"  * 1DF socket with union nut ISO 2853  • 2"  • 2½"  M83  • 3"  M84  • 3"  M84  • 3"  M87  * 4"  * 5"  * 1DF threaded socket ISO 2853  • 2"  • 2½"  M83  • 3"  M84  • 3"  M84  • 3"  M84  • 3"  M84  • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG  • DN 50, PN 16  • DN 2½", PN 16  • DN 2½", PN 16  • DN 2½", PN 16  • DN 4, PN 16  • DN 5, PN 16  • DN 4, PN 16  • DN 5, PN 16  • DN 6, PN 16  • DN 6, PN 16  • DN 8, PN 16  • DN 9, PN 16  • DN 9, PN 16  • DN 10, PN 16  • DN 8, PN 16  • DN 9, PN 16  • DN 10, PN 16  • DN 10, PN 16  • DN 2, PN 16  • DN 3, PN 16		N28	✓	✓	✓
Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil silicone oil silicone oil control of the process connection to DRD  • DN 50, PN 40  SMS socket with union nut  • 2"		P00	✓	✓	✓
only in conjunction with measuring cell filling silicone oil  Sanitary process connection to DRD  • DN 50, PN 40  SMS socket with union nut  • 2"  • 2½"  • 3"  SMS threaded socket  • 2"  • 2½"  M73  M74  • 3"  SMS threaded socket  • 2"  • 2½"  M74  • 3"  M75  M75   • 2"  • 2½"  M88  • 3"  IDF socket with union nut ISO 2853  • 2"  • 2½"  M88  • 3"  IDF threaded socket ISO 2853  • 2"  • 2½"  M89  • 3"  M84  • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG  • DN 50, PN 16  • DN 80, PN 16  • DN 2½", PN 16  • DN 2½", PN 16  • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG  • DN 50, PN 16  • DN 4", PN 16  • DN 4", PN 16  • DN 4", PN 16  • DN 50, PN 16  • DN 80, PN 16  • DN 90, P		P10	✓	✓	✓
• DN 50, PN 40  SMS socket with union nut  • 2" • 2½" • 2½" • 3"  M68 • ✓ ✓ ✓  SMS threaded socket • 2" • ½½" • 3"  IDF socket with union nut ISO 2853 • 2" • ½½" • 3"  IDF socket with union nut ISO 2853 • 2" • ½½" • 3"  IDF threaded socket ISO 2853 • 2" • ½½" • 3"  M84 • ✓ ✓ ✓  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 3", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 3", PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16	only in conjunction with measuring cell filling				
SMS socket with union nut  • 2" • 2½" • 3"  SMS threaded socket • 2" • 2½" • 3"  M73  M74  • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 3", PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 50, PN 16	• •			,	
• 2" • 2½" • 2½" • 3"  SMS threaded socket • 2" • 2½" • 3"  M73  M74 • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  M84   * Y  * Y  * Y  * Y  * Y  * Y  * Y  *	,	M32	<b>V</b>	<b>V</b>	•
• 3"  SMS threaded socket  • 2"  • 2½"  • 3"  IDF socket with union nut ISO 2853  • 2"  • 2½"  • 3"  IDF threaded socket ISO 2853  • 2"  • 2½"  • 3"  IDF threaded socket ISO 2853  • 2"  • 2½"  • 3"  IDF threaded socket ISO 2853  • 2"  • 2½"  • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG  • DN 50, PN 16  • DN 80, PN 16  • DN 80, PN 16  • DN 100, PN 16  • DN 2½", PN 16  • DN 2½", PN 16  • DN 3", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG  • DN 50, PN 16  • DN 100, PN 16  • DN 100, PN 16  • DN 50, PN 16  • DN		M67	1	✓	✓
SMS threaded socket  • 2" • 2½" • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  M82 • 2½" • 3"  M83 • ✓ ✓ ✓  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  M84 • ✓ ✓ ✓  Sanitary process connection to NEUMO Bio-Connect screw connection Cortified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 50, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 50, PN 16 • DN 100, PN 16 • DN 50, PN 16 • DN 100, PN 16 • DN 2", PN 16			1		1
• 2" • 2½" • 3"  IDF socket with union nut ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 2½", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16 Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 4", PN 16 • DN 50, PN 16 • DN 4", PN 16 • DN 50, PN 16 •	-	MOS	ľ	•	v
N75	• 2"				✓
DF socket with union nut ISO 2853   2"			1	1	1
• 2½" • 3"  IDF threaded socket ISO 2853 • 2" • 2½" • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection © DN 50, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 3, PN 16 • DN 4", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect screw connection © DN 50, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 3, PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 50, PN 16 • DN 100, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 3", PN 16	-	11170	Í	·	·
• 3"  IDF threaded socket ISO 2853  • 2"  • 2½"  • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG  • DN 50, PN 16  • DN 65, PN 16  • DN 80, PN 16  • DN 100, PN 16  • DN 2½", PN 16  • DN 3", PN 16  • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect screw connection Qu14  • DN 4", PN 16  • DN 4", PN 16  • DN 50, PN 16  • DN 70, PN 16	_				
• 2" • 2½" • 2½" • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG • DN 50, PN 16 • DN 65, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 50, PN 16 • DN 50, PN 16 • DN 60, PN 16 • DN 60, PN 16 • DN 60, PN 16 • DN 70, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 2½", PN 16 • DN 3", PN 16					
• 2½" • 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG • DN 50, PN 16 • DN 65, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 3", PN 16 • DN 4", PN 16 Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 4", PN 16 • DN 4", PN 16 • DN 50, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 3", PN 16	IDF threaded socket ISO 2853				
• 3"  Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG  • DN 50, PN 16  • DN 65, PN 16  • DN 80, PN 16  • DN 100, PN 16  • DN 2", PN 16  • DN 3", PN 16  • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG  • DN 50, PN 16  • DN 100, PN 16  • DN 2", PN 16  • DN 3", PN 16	_				
NEUMÓ Bio-Connect screw connection         Certified to EHEDG         • DN 50, PN 16         • DN 65, PN 16         • DN 80, PN 16         • DN 100, PN 16         • DN 2", PN 16         • DN 2½", PN 16         • DN 3", PN 16         • DN 4", PN 16         • DN 4", PN 16         Sanitary process connection to NEUMO Bio-Connect flange connection         Certified to EHEDG         • DN 50, PN 16         • DN 65, PN 16         • DN 80, PN 16         • DN 80, PN 16         • DN 100, PN 16         • DN 2", PN 16         • DN 3", PN 16					
• DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 3", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 50, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 3", PN 16 • DN 3", PN 16 • DN 3", PN 16	NEUMO Bio-Connect screw connection				
• DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2½", PN 16 • DN 3", PN 16		Q05	1	1	1
• DN 100, PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 2½", PN 16 • DN 3", PN 16					
• DN 2", PN 16 • DN 2½", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16					
• DN 3", PN 16 • DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16	• DN 2", PN 16	Q13	1		
• DN 4", PN 16  Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG  • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 3", PN 16 • DN 3", PN 16					
Bio-Connect flange connection         Certified to EHEDG         • DN 50, PN 16       Q23       ✓       ✓         • DN 65, PN 16       Q24       ✓       ✓         • DN 80, PN 16       Q25       ✓       ✓         • DN 100, PN 16       Q26       ✓       ✓         • DN 2", PN 16       Q31       ✓       ✓         • DN 2½", PN 16       Q32       ✓       ✓         • DN 3", PN 16       Q33       ✓       ✓					
<ul> <li>DN 50, PN 16</li> <li>DN 65, PN 16</li> <li>DN 80, PN 16</li> <li>DN 100, PN 16</li> <li>DN 2", PN 16</li> <li>DN 2", PN 16</li> <li>DN 2", PN 16</li> <li>DN 2", PN 16</li> <li>Q32</li> <li>Y</li> <li< td=""><td>Bio-Connect flange connection</td><td></td><td></td><td></td><td></td></li<></ul>	Bio-Connect flange connection				
<ul> <li>DN 80, PN 16</li> <li>DN 100, PN 16</li> <li>DN 2", PN 16</li> <li>DN 2½", PN 16</li> <li>DN ½", PN 16</li> <li>DN 3", PN 16</li> <li>Q33</li> <li>✓</li> <l< td=""><td></td><td>Q23</td><td>1</td><td>1</td><td>✓</td></l<></ul>		Q23	1	1	✓
• DN 100, PN 16       Q26       ✓       ✓         • DN 2", PN 16       Q31       ✓       ✓         • DN 2½", PN 16       Q32       ✓       ✓         • DN 3", PN 16       Q33       ✓       ✓					
• DN 2", PN 16       Q31       ✓       ✓         • DN 2½", PN 16       Q32       ✓       ✓         • DN 3", PN 16       Q33       ✓       ✓	•		1	1	1
• DN 3", PN 16 Q33 ✓ ✓ ✓			✓	✓	1
					<b>✓</b>
• DN 4", PN 16 Q34 ✓ ✓ ✓	•			✓	✓

Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection to NEUMO Bio-Connect clamp connection Certified to EHEDG				
• DN 50, PN 16	Q39	✓	✓	✓
• DN 65, PN 10	Q40	✓.	✓.	✓.
• DN 80, PN 10	Q41	<b>√</b>	1	<b>√</b>
<ul><li>DN 100, PN 10</li><li>DN 2½", PN 16</li></ul>	Q42 Q48	<b>∀</b>	<b>∀</b>	<b>V</b>
• DN 3", PN 10	Q49	1	1	1
• DN 4", PN 10	Q50	✓	✓	1
Sanitary process connection to NEUMO Bio-Connect S flange connection Certified to EHEDG				
• DN 2", PN 16	Q72	✓	✓	✓
Aseptic threaded socket to DIN 11864-1				
Form A approved according to EHEDG				
• DN 50, PN 25	N33	1	1	1
• DN 65, PN 25	N34	✓	<b>√</b>	✓
• DN 80, PN 25	N35	✓	✓	✓
• DN 100, PN 25	N36	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A				
approved according to EHEDG			,	
• DN 50, PN 16	N43 N44	1	<b>√</b>	1
<ul><li>DN 65, PN 16</li><li>DN 80, PN 16</li></ul>	N44 N45	<b>V</b>	1	<b>*</b>
• DN 100, PN 16	N46	1	1	1
Aseptic flange with groove to DIN 11864-2 Form A approved according to EHEDG				
• DN 50, PN 16	N43 + P11	✓	✓	✓
• DN 65, PN 16	N44 + P11	✓	✓	✓
• DN 80, PN 16	N45 + P11	✓	✓	✓
• DN 100, PN 16	N46 + P11	✓	✓	✓
Aseptic clamp with groove to DIN 11864-3 FormA				
approved according to EHEDG				
• DN 50, PN 25	N53	1	1	1
• DN 65, PN 25	N54	1	1	<b>√</b>
<ul><li>DN 80, PN 16</li><li>DN 100, PN 16</li></ul>	N55 N56	<b>V</b>	<b>v</b>	<b>v</b>
1) = 6 6 1	.100		•	·

Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H.

<sup>2)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>3)</sup> Approval pending.

<sup>4)</sup> Special seal in Viton included in the scope of delivery

<sup>5)</sup> Cannot be combined with Order codes P00 and P10. Can only be ordered with silicone oil measuring cell filling.

 $<sup>^{\</sup>rm 6)}$  The weldable socket can be ordered under accessories.

<sup>7)</sup> Certified to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Selection and Ordering data	Order	code		
Additional data		HART	PA	F
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	✓	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text:	Y15	✓	✓	•
Y15:  Measuring point text (entry in device variable)  Max. 27 characters, specify in plain text:	Y16	✓	✓	,
Y16:				
Entry of HART address (TAG)	Y17	✓		
Max. 8 characters, specify in plain text: Y17:				
Setting of pressure indicator in pressure units	Y21	✓	✓	•
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
The following pressure units can be selected: bar, mbar, mm $H_2O^*)$ , in $H_2O^*)$ , ft $H_2O^*)$ , mm $HG$ , in $HG$ , psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % $^{\circ}$ ) ref. temperature 20 °C				
Setting of pressure indication in non-pressure units <sup>2)</sup>	Y22 + Y01	✓		
Specify in plain text: Y22: up to I/min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)				
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	
Damping adjustment in seconds	Y30	./	1	

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

#### ordering example

Item line: 7MF4133-1DB20-1AB7-Z

B line: A22 + Y01 + Y21

C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)

C line: Y21: bar (psi)

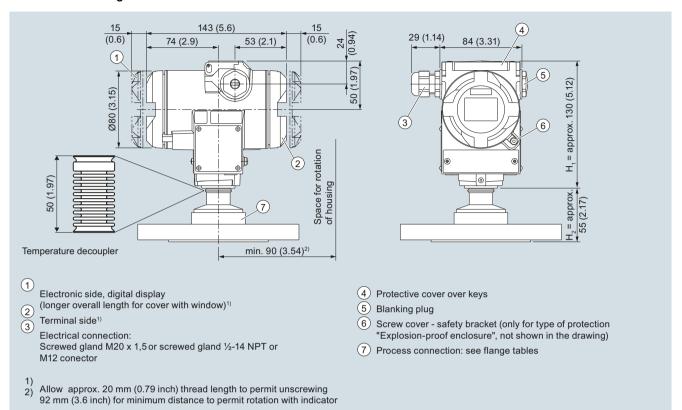
<sup>&</sup>lt;sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>&</sup>lt;sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

#### Dimensional drawings



SITRANS P pressure transmitters, DS III series for gauge pressure, with front-flush diaphragm, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into  $H_1$  and  $H_2$ .

H<sub>1</sub> = Height of the SITRANS P300 up to a defined cross-section

 $H_2$  = Height of the flange up to this defined cross-section

Only the height H<sub>2</sub> is indicated in the dimensions of the flanges.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

#### Flanges as per EN and ASME

#### Flange to EN



80 40

M16

#### Flanges to ASME

#### **ASME B16.5**

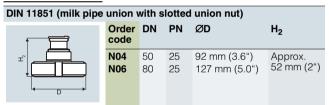


Order code	DN	PN	ØD	H <sub>2</sub>
M40	1"	150	110 mm (4.3")	Approx.
M41	1½"	150	130 mm (5.1")	52 mm (2")
M42	2"	150	150 mm (5.9")	
M43	3"	150	190 mm (7.5")	
M44	4"	150	230 mm (9.1")	
M45	1"	300	125 mm (4.9")	
M46	1½"	300	155 mm (6.1")	
M47	2"	300	165 mm (6.5")	
M48	3"	300	210 mm (8.1")	
M49	4"	300	255 mm (10.0")	

200 mm (7.9")

#### NuG and pharmaceutical connections

#### Connections to DIN



Tri-Clamp nach DIN 32676								
<b>↑</b>	Order code	DN	PN	ØD	H <sub>2</sub>			
±2	N14 N15	50 65	16 10	64 mm (2.5") 91 mm (3.6")	Approx. 52 mm (2")			

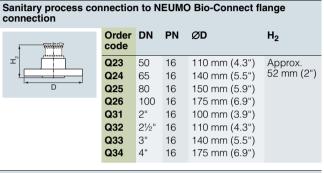
#### Other connections

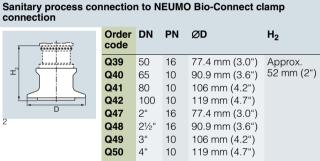
Varivent connection
<b>T</b>

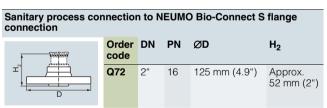
Order code	DN	PN	ØD	H <sub>2</sub>
N28	40 125	40	84 mm (3.3")	Approx. 52 mm (2")

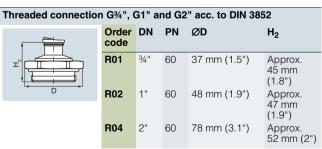
Sanitary process connection to DRD								
	Order code	DN	PN	ØD	H <sub>2</sub>			
T <sup>S</sup> D	M32	50	40	105 mm (4.1")	Approx. 52 mm (2")			

#### Sanitary process screw connection to NEUMO Bio-Connect Order DN PΝ Hο code Q05 50 16 82 mm (3.2") Approx. 006 105 mm (4.1") 52 mm (2") 65 16 115 mm (4.5") Q07 80 16 Q08 100 16 145 mm (5.7") Q13 2" 82 mm (3.2") 16 Q14 21/2" 105 mm (4.1") 16 3" Q15 16 105 mm (4.1") 4" Q16 16 145 mm (5.7")









Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

#### Tank connection TG 52/50 and TG52/150 Order DN PN ØD $H_2$ code R10 63 mm (2.5") 25 40 Approx. 63 mm (2.5")Approx. 170 mm R11 25 40 63 mm (2.5") (6.7")

SMS socket with union nut								
	Order code	DN	PN	ØD	H <sub>2</sub>			
I T	M67	2"	25	84 mm (3.3")	Approx.			
	M68	21/2"	25	100 mm (3.9")	52 mm (2")			
	M69	3"	25	114 mm (4.5")				
D								

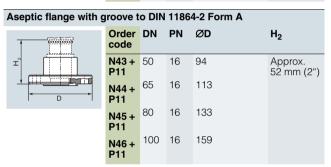
DN	DNI	~-	
		ØD	H <sub>2</sub>
21/2"	25	85 x 1/6 mm	Approx. 52 mm (2")
	2" 2½"	2" 25 2½" 25	2" 25 70 x 1/6 mm 2½" 25 85 x 1/6 mm

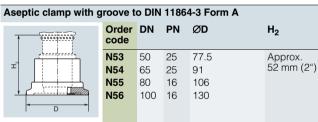
IDF socket with union nut						
	Order code	DN	PN	ØD	H <sub>2</sub>	
<b>1</b>	M82	2"	25	77 mm (3")	Approx.	
	M83	21/2"	25	91 mm (3.6")	52 mm (2")	
D	M84	3"	25	106 mm (4.2")		

IDF threaded socket						
	Order code	DN	PN	ØD	H <sub>2</sub>	
		2" 2½"		64 mm (2.5") 77.5 mm (3.1")	Approx. 52 mm (2")	
D	M94	3"	25	91 mm (3.6")		

Aseptic threaded socket to DIN 11864-1 Form A					
	Order code	DN	PN	ØD	H <sub>2</sub>
<u></u>	N33	50	25	78 x 1/6"	Approx.
ı ı	N34	65	25	95 x 1/6"	52 mm (2")
	N35	80	25	110 x 1/4"	
D	N36	100	25	130 x 1/4"	

Aseptic flange with notch to DIN 11864-2 Form A					
	Order code	DN	PN	ØD	H <sub>2</sub>
<b>1</b>	N43	50	16	94	Approx. 52 mm (2")
	N44	65	16	113	52 mm (2")
	N45	80	16	133	
l D l	N46	100	16	159	





Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

### Technical specifications

Electrical damping (step width 0.1 s)

Technical specifications					
SITRANS P DS III series for absolute pressure (from the ga	uge pressure series	)			
Input					
Measured variable	Absolute pressure				
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus			
				Max. perm. test pressure	
	8.3 250 mbar a 0.83 25 kPa a 3 100 inH <sub>2</sub> O a	250 mbar a 25 kPa a 100 inH <sub>2</sub> O a	1.5 bar a 150 kPa a 21.8 psia	6 bar a 600 kPa a 87 psia	
	43 1300 mbar a 4.3 130 kPa a 17 525 inH <sub>2</sub> O a	1300 mbar a 130 kPa a 525 inH <sub>2</sub> O	2.6 bar a 260 kPa a 37.7 psia	10 bar a 1 MPa a 145 psia	
	160 5000 mbar a 16 500 kPa a 2.32 72.5 psia	5000 mbar a 500 kPa a 72.5 psia	10 bar a 1 MPa a 145 psia	30 bar a 3 MPa a 435 psia	
	1 30 bar a 0.1 3 MPa a 14.5 435 psia	30 bar a 3 MPa a 435 psia	45 bar a 4.5 MPa a 653 psia	100 bar a 10 MPa a 1450 psia	
Lower measuring limit					
Measuring cell with silicone oil filling	0 mbar a (0 psia)				
Measuring cell with inert filling liquid					
- for process temperature -20 °C < 9 $\leq$ +60 °C (-4 °F < 9 $\leq$ +140 °F)	30 mbar a/0 kPa a/0 psia				
- for process temperature 60 °C < $9 \le +100$ °C (max. 85 °C for measuring cell 30 bar) (140 °F < $9 \le +212$ °C (max. 185 °C for measuring cell 435 psi))	30 mbar a + 20 mbar a · (9 - 60 °C)/°C 3 kPa a + 2 kPa a · (9 - 60 °C)/°C 0.44 psi a + 0.29 psi a · (9 - 108 °F)/°F				
Upper measuring limit	(for oxygen measure	100 % of max. span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (108 °F) ambient temperature/process temperature)			
Start of scale value	Between the measu	ring limits (fully adjust	able)		
Output	HART		PROFIBUS PA/FOUNDATION Fieldbus		
Output signal	4 20 mA		Digital PROFIBUS PA FOUNDATION Field		
<ul> <li>Lower limit (infinitely adjustable)</li> </ul>	3.55 mA, factory pre	eset to 3.84 mA	-		
Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA				
Load					
Without HART	$R_{\rm B} \leq (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V				
• With HART	$R_{\rm B} = 230 \dots 500~\Omega$ (SIMATIC PDM) or $R_{\rm B} = 230 \dots 1100~\Omega$ (HART Communicator)				
Physical bus	- IEC 61158-2				
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.				

Set to 2 s (0 ... 100 s)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

SITRANS P DS III series for absolute pressure (from the gauge pressure series)				
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Silicone oil filling</li> <li>Room temperature 25 °C (77 °F)</li> </ul>			
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span or nom. pressure range			
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic				
- r ≤ 10	≤ 0.1 %			
- 10 < r ≤ 30	≤ 0.2 %			
Influence of ambient temperature (in percent per 28 °C (50 °F))				
• 250 mbar/25 kPa/3.6 psi	$\leq$ (0.15 · r + 0.1) %			
• 1300 mbar a/130 kPa a/18.8 psia 5 bar /500 kPa a/72.5 psia 30 bar /3000 kPa a/435 psia 100 bar /10 MPa a/1450 psia 160 bar /16 MPa a/2321 psia 400 bar /40 MPa a/5802 psia 700 bar /50 MPa a/10152 psia	$\leq$ (0.08 · r + 0.16) %			
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % in 5 years			
Effect of mounting position (in pressure per change in angle)	≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination (zero point correction is possible with position error compensation)			
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V			
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 · 10 <sup>-5</sup> of nominal measuring range			
Rated conditions				
Degree of protection (to IEC 60529)	IP66 (optional IP66/IP68), NEMA 4X			
Temperature of medium				
Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F) -20 +100 °C (-4 +212 °F) with 30 bar a measuring cell			
<ul> <li>Measuring cell with inert filling liquid</li> </ul>	-20 +100 °C (-4 +212 °F)			
<ul> <li>In conjunction with dust explosion protection</li> </ul>	-20 +60 °C (-4 +140 °F)			
Ambient conditions				
Ambient temperature				
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 +185 °F)			
- Display readable	-30 +85 °C (-22 +185 °F)			
Storage temperature	-50 +85 °C (-58 +185 °F)			
Climatic class				
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for use in the tropics			
Electromagnetic Compatibility				
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21			

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

Design					
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)				
Enclosure material	Low-copper die-cast aluminum, 0 no. 1.4408	Low-copper die-cast aluminum, GD-AISi 12 or stainless steel precision casting, ma no. 1.4408			
Wetted parts materials					
Connection shank	Stainless steel, mat. no. 1.4404/3	316L or Hastelloy C4, mat. no. 2.4610			
Oval flange	Stainless steel, mat. no. 1.4404/3	Stainless steel, mat. no. 1.4404/316L			
Seal diaphragm	Stainless steel, mat. no. 1.4404/3	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819			
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen me (140 °F))	(maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C			
Process connection		Connection shank G½B to EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MAWP 2320 psia)) to DIN 19213 with mounting thread M10 or $^7/_{16}$ -20 UNF to IEC 61518			
Material of mounting bracket					
• Steel	Sheet-steel, Mat. No. 1.0330, chr	Sheet-steel, Mat. No. 1.0330, chrome-plated			
Stainless steel	Sheet stainless steel, mat. no. 1.4	Sheet stainless steel, mat. no. 1.4301 (SS 304)			
Power supply $U_{H}$	HART	PROFIBUS PA/FOUNDATION Fieldbus			
Torminal valtage on transmitter	10.5 45.V.D.C	10 F 45 V DC			

Power supply $U_{\mathbb{H}}$	HART	PROFIBUS PA/FOUNDATION Fieldbus	
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-	
Power supply		Supplied through bus	
Separate 24 V power supply necessary	-	No	
Bus voltage			
• Not Ex	-	9 32 V	
With intrinsically-safe operation	-	9 24 V	
Current consumption			
Basic current (max.)	-	12.5 mA	
• Start-up current ≤ basic current	-	Yes	
Max. current in event of fault	-	15.5 mA	
Fault disconnection electronics (FDE) available	-	Yes	

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for absolute pressure (from gauge pressure series)

#### SITRANS P DS III series for absolute pressure (from the gauge pressure series) PROFIBUS PA/ FOUNDATION Fieldbus HART Certificates and approvals Classification according to PED 97/23/EC For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice) Explosion protection Intrinsic safety "i" PTB 13 ATEX 2007 X Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb - Marking -40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 - Permissible ambient temperature - Connection To certified intrinsically-safe circuits with FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ peak values: $U_{\rm i} = 30 \text{ V}, I_{\rm i} = 100 \text{ mA}, P_{\rm i} = 750 \text{ mW}; R_{\rm i} = 300 \Omega$ Linear barrier: $U_{\rm o}$ = 24 V, $I_{\rm o}$ = 250 mA, $P_{\rm o}$ = 1.2 W - Effective internal inductance/capacitance $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ $L_i = 7 \mu H, C_i = 1.1 nF$ Explosion-proof "d" PTB 99 ATEX 1160 - Marking Ex II 1/2 G Ex d IIC T4/T6 Gb - Permissible ambient temperature -40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 - Connection To circuits with values: $U_{\rm H}$ = 10.5 ... 45 V | To circuits with values: $U_{\rm H}$ = 9 ... 32 V DC Dust explosion protection for zone 20 PTB 01 ATEX 2055 - Marking Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db - Permissible ambient temperature -40 ... +85 °C (-40 ... +185 °F) 120 °C (248 °F) - Max. surface temperature - Connection To certified intrinsically-safe circuits with FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ peak values: $U_{\rm i} = 30 \text{ V}, I_{\rm i} = 100 \text{ mA}, P_{\rm i} = 750 \text{ mW}, R_{\rm i} = 300 \Omega$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1.2 \text{ W}$ - Effective internal inductance/capacitance $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ $L_i = 7 \mu H, C_i = 1.1 nF$ Dust explosion protection for zone 21/22 PTB 01 ATEX 2055 - Marking Ex II 2 D Ex tb IIIC T120°C Db To circuits with values: $U_{\rm H}$ = 10.5 ... 45 V To circuits with values: $U_{\rm H}$ = 9 ... 32 V - Connection DC; $P_{\text{max}} = 1.2 \text{ W}$ DC: $P_{\text{max}} = 1 \text{ W}$ • Type of protection "n" (zone 2) PTB 13 ATEX 2007 X Ex II 2/3 G Ex nA II T4/T5/T6 Gc - Marking Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc - Connection (Ex nA) $U_{\rm m} = 32 \text{ V}$ FISCO supply unit ic: $U_0 = 17.5 \text{ V}, I_0 = 570 \text{ mA}$ - Connection (Ex ic) To circuits with values: $U_{i} = 45 \text{ V}$ Linear barrier: $U_{\rm O}$ = 32 V, $I_{\rm O}$ = 132 mA, $P_{\rm O}$ = 1 W - Effective internal inductance/capacitance $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ $L_i = 7 \mu H$ , $C_i = 1.1 nF$ Explosion protection acc. to FM Certificate of Compliance 3008490 - Identification (XP/DIP) or (IS); (NI) CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III • Explosion protection to CSA Certificate of Compliance 1153651 CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, - Identification (XP/DIP) or (IS)

DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

### Transmitters for applications with advanced requirements (Advanced)

	SITRANS	P DS III for absolute pressure (	from gauge pressure series)
HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	
PROFIBUS PA communication		- Adaptation to customer-specif-	Yes, linearly rising or falling characteristic
Simultaneous communication with master class 2 (max.)	4	ic process variables - Electrical damping, adjustable	0 100 s
The address can be set using	Configuration tool or local opera-	- Simulation function	
3	tion (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or		value)
• Input byte	10 (two measured values) 0, 1, or 2 (register operating mode and reset function for	- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively
Internal preprocessing	metering)	- Square-rooted characteristic for flow measurement	Yes
Device profile	PROFIBUS PA Profile for Pro-	• PID	Standard FOUNDATION
Device profile	cess Control Devices Version 3.0, class B		Fieldbus function block
Function blocks	2	Physical block	1 resource block
Analog input	_	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	LCD
- Electrical damping, adjustable	0 to 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Simulation function: Measured pressure value, sensor temper-	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electronics tempera- ture	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
<ul> <li>Physical block</li> </ul>	1		

Transducer blocks

two pressures

characteristic with - Square-rooted characteristic for flow measurement - Gradual volume suppression

sor temperature

• Pressure transducer block - Can be calibrated by applying

- Monitoring of sensor limits

- Specification of a container

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

2

Yes

Yes

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

mert liquid¹¹) grease-free to cleanliness level 2  Measuring span (min max.)  3 250 mbar a (0.12 3.62 psia)	Selection and Orderin	~					No		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Measuring cell filling Measuring cell cleaning  Silicone oil normal grease-free to cleanliness level 2  Measuring span (min max.)  3. 3 250 mbar a (0.12 3.62 psia) D  3. 3 250 mbar a (0.62 18.85 psia) F  3. 1.300 mbar a (0.62 18.85 psia) F  3. 1.300 mbar a (0.62 18.85 psia) D  1. 1 30 bar a (1.4.5 435 psia) D  Wetted parts materials  Seal diaphragm Process connection  Stainless steel Stainless steel B  Hastelloy Stainless steel Stainless stee				71	MF	4	2 3	3	-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Measuring cell filling Measuring cell cleaning  Silicone oil normal 1 1 grease-free to cleanliness level 2 2 1 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3					4		•		ч
cleaning Inert liquid¹) Inert liquid¹ Inert liquid² Inert liquid¹ Inert liquid¹ Inert liquid¹ Inert liquid² Inert liquid¹ Inert liquid² I	✓ Click on the Article N	lo. for the online configu	-						
Inert liquid 1) grease-free to cleanliness level 2  Measuring span (min max.)  8.3 250 mbar a (0.12 3.62 psia) 43 1300 mbar a (0.62 18.85 psia) 51 1300 mbar a (1.45 435 psia) 61 30 bar a (2.32 72.5 psia) 61 30 bar a (1.4.5 435 psia) 71 30 bar a	Measuring cell filling					П			
Measuring span (min max.)  3 250 mbar a (0.12 3.62 psia) 43 1300 mbar a (0.62 18.85 psia) 64 1300 mbar a (0.62 18.85 psia) 65 16 5 bar a (2.32 72.5 psia) 67 18.85 psia) 71.6 5 bar a (2.32 72.5 psia) 72.1 30 bar a (14.5 435 psia) 74 435 psia) 75 445 psia) 75 .	Silicone oil	•	•	1					
Measuring span (min max.) 3.3 250 mbara (0.12 3.62 psia) 43 1300 mbar a (0.62 18.85 psia) 45 1300 mbar a (2.32 72.5 psia) 46 30 bar a (14.5 435 psia) 47 485 psia) 48 430 bar a (14.5 435 psia) 49 Metted parts materials 58 cal diaphragm Process connection 59 Catalless steel Stainless steel 40 Hastelloy Stainless steel 41 Hastelloy Stainless steel 42 Hastelloy Hastelloy 42 Version for diaphragm seal <sup>2) 3) 4) 5) 6) 43                                    </sup>	4.5								
3.3 250 mbar a (0.12 3.62 psia)   43 1300 mbar a (0.62 18.85 psia)   5	mort iiqaia			ľ					
3.3 250 mbar a (0.12 3.62 psia)   43 1300 mbar a (0.62 18.85 psia)   5 6 5 bar a (2.32 72.5 psia)   6 1300 mbar a (14.5 435 psia)   6 30 bar a (14.5 435 psia)   7 30 bar a (14.5 435 psia)   8 435 psia)   8 435 psia)   8 435 psia)   9 44	Measuring span (min.	max.)							
43 1300 mbar a (0.62 18.85 psía) 0.16 5 bar a (2.32 72.5 psia) 1.16 5 bar a (2.32 72.5 psia) Wetted parts materials Seal diaphragm Process connection Stainless steel Stainless steel Hastelloy Stainless steel Hastelloy Hastelloy Version for diaphragm seal <sup>2)</sup> 3) 4) 5) 6) Process connection Connection shank G½B to EN 837-1 Female thread ½-14 NPT Stainless steel oval flange with process connection (Oval flange has no female thread) - Mounting thread 7/16-20 UNF to EN 61518 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 - Male thread ½-14 NPT - Mon-wetted parts materials - Housing made of die-cast aluminium - Housing made of die-cast aluminium - Housing stainless steel precision casting <sup>7</sup> ) Version - Standard version, German plate inscription, setting for pressure unit: bar - Chinese version, English plate inscription, setting for pressure unit: bar - Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion-proof (Ex d)** - "Explosion-proof (Ex d)** - "Explosion-proof (Ex d)** - "Intrinsic safety (Ex ia)* - "Intrinsic safety, explosion-proof enclosure and dust explosion protection: - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)** - "Ex nA/ic (Zone 2)** - "Explosion-proof (Ex A)** - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)** - "Intrinsic Safe and Explosion Proof (is + xp)** - "Explosion-proof (Ex a)** - "Explosion-proof (Ex a)*		•	•		D				
### Wetted parts materials Seal diaphragm	43 1300 mbar a				F				
Wetted parts materials Seal diaphragm Process connection Stainless steel Stainless steel A Hastelloy Stainless steel B Hastelloy Hastelloy C Version for diaphragm seal <sup>2)</sup> 3) 4) 5) 6)  Process connection  Connection shank G½B to EN 837-1  • Cannection shank G½B to EN 837-1  • Stainless steel oval flange with process connection (Oval flange has no female thread)  • Mounting thread M10 to DIN 19213  • Mounting thread M10 to DIN 19213  • Male thread M2 × 14 NPT  Non-wetted parts materials  • Housing made of die-cast aluminium  • Housing stainless steel precision casting <sup>7)</sup> Version  • Standard version, German plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: bar  • Intersions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion-proof (Ex d)**  • "Explosion-proof (Ex d)**  • "Explosion-proof (Ex d)**  • "Intrinsic safety (Ex ia)*  • "Explosion-proof (Ex d)**  • "Thirinsic safety explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)**  • "The CSA (is + ep) + Ex ia + Ex d (ATEX)**  • Screwed gland M20X1.5  • Screwed gland M2-14 NPT  • Han 7D plug (plastic housing) incl. mating connector <sup>12</sup> • Constant of the steel of the st	0.16 5 bar a	(2.32 72.5 psia)			G				
Seal diaphragm Process connection  Stainless steel Stainless steel Hastelloy Stainless steel Hastelloy Hastelloy C Version for diaphragm seal <sup>2) 3) 4) 5) 6) Y  Process connection  • Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) • Mounting thread M10 to DIN 19213 • Mounting thread M10 to DIN 19213 • Mounting thread M10 to DIN 19213 • Male thread ½-14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting<sup>7)</sup>  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • International version, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: • "Intrinsic safety (Ex ia)" • "Explosion-proof (Ex d)*<sup>8)</sup> • "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)*<sup>(9)</sup> 11) • FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)*<sup>(11)</sup> • With FM + CSA, Type of protection: • "Intrinsic Safe and Explosion Proof (is + xp)*<sup>(8)</sup> • Screwed gland M20x1.5 • Hand To plug (plastic housing) incl. mating connector **  • Can display the displayed of the mating connector **  • Can display the mating connector **  • C</sup>	1 30 bar a				Н				
Stainless steel Stainless steel Hastelloy Stainless steel Hastelloy Hastelloy Version for diaphragm seal <sup>2) 3) 4) 5) 6)  Process connection • Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) • Mounting thread M10 to DIN 19213 • Mounting thread M10 to DIN 19213 • Male thread M20 x 1.5 • Male thread M20 x 1.5 • Male thread M2 + 14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting<sup>7)</sup>  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish, Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: • "Intrinsic safety, and flameproof enclosure" (Ex ia + Ex d)* • "Ex plosion-proof (Ex d)*8) • "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)* • "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)* • "Intrinsic safety and flameproof inclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)* • "Intrinsic safety and Flame proof (is + xp)* • "Ex place of the plant in the </sup>	Wetted parts materials	3							
Hastelloy Stainless steel Hastelloy Hastelloy Version for diaphragm seal <sup>2) 3) 4) 5) 6)  Process connection Connection shank G½B to EN 837-1 Stainless steel oval flange with process connection (Oval flange has no female thread) - Mounting thread M10 to DIN 19213 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 - Male thread ½ -14 NPT  Non-wetted parts materials - Housing made of die-cast aluminium - Housing stainless steel precision casting - Standard version, German plate inscription, setting for pressure unit: bar - International version, English plate inscription, setting for pressure unit: bar - International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection - With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" - "Explosion-proof (Ex d)" - "Ex nA/ic (Zone 2)" - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" - "Intrinsic safety, explosion-proof (Ex ia + Ex d + Zone 1D/2D)" - "Intrinsic Safe and Explosion Proof (is + xp)" - "Excrewed gland ½-14 NPT - Han 7D plug (plastic housing) incl. mating connector 12  - Har 7D plug (plastic housing) incl. mating connector 12</sup>	Seal diaphragm	Process connection							
Hastelloy Stainless steel Hastelloy Hastelloy Version for diaphragm seal <sup>2) 3) 4) 5) 6)  Process connection • Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) • Mounting thread 7/<sub>16-20</sub> UNF to EN 61518 • Mounting thread M10 to DIN 19213 • Male thread M20 x 1.5 • Mousing made of die-cast aluminium • Housing stainless steel precision casting<sup>7)</sup>  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription,</sup>	Stainless steel	Stainless steel	•		Α				
Hastelloy Version for diaphragm seal <sup>2) 3) 4) 5) 6)  Process connection  Connection shank G½B to EN 837-1  • Female thread ½-14 NPT  • Stainless steel oval flange with process connection (Oval flange has no female thread)  - Mounting thread ¾16-20 UNF to EN 61518  - Mounting thread M10 to DIN 19213  - Mounting thread M12 to DIN 19213  • Male thread ½ -14 NPT  Non-wetted parts materials  • Housing made of die-cast aluminium  • Housing stainless steel precision casting<sup>7)</sup>  Version  • Standard version, German plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish, Includes Compact operating instructions in 21 EU languages.  Explosion protection  • With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)"8)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"9)11)  • FM + CSA intrinsic safe (is)  • FM + CSA intrinsic safe (is)  • FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)"8)  Electrical connection/cable entry  • Screwed gland M20x1.5  • Screwed gland M20x1.5</sup>	Hastellov	Stainless steel							
Version for diaphragm seal <sup>2) 3) 4) 5) 6)  Process connection  • Connection shank G½B to EN 837-1 • Stainless steel oval flange with process connection (Oval flange has no female thread)  - Mounting thread M10 to DIN 19213  - Monewetted parts materials  - Housing made of die-cast aluminium  - Housing stainless steel precision casting<sup>7)</sup>  Version  • Standard version, German plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection  • None  • With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)**  - "Explosion-proof (Ex d)**  - "Ex nA/ic (Zone 2)**  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)**  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)**  - "Intrinsic Safe and Explosion Proof (is + xp)**  • FM + CSA intrinsic safe (is)  • FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)**  • Screwed gland ½-14 NPT  • Han 7D plug (plastic housing) incl. mating connector 12.</sup>	Hastellov	Hastellov							
Process connection Connection shank G½B to EN 837-1 Stainless steel oval flange with process connection (Oval flange has no female thread) Mounting thread M10 to DIN 19213 Mounting thread M10 to DIN 19213 Male thread M20 x 1.5 Male thread M2 x 1.5 Male thread ½ -14 NPT  Non-wetted parts materials Housing made of die-cast aluminium Housing stainless steel precision casting  Version Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection None  With ATEX, Type of protection: "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)** "Explosion-proof (Ex d)** "Ex nA/ic (Zone 2)** "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)** "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)** "FM + CSA intrinsic safe (is) FM + CSA, Type of protection: "Intrinsic Safe and Explosion Proof (is + xp)** "Screwed gland Y2-14 NPT Han 7D plug (plastic housing) incl. mating connector 12  Han 7D plug (plastic housing) incl. mating connector 12	Version for diaphragm s	seal <sup>2) 3) 4) 5) 6)</sup>							
• Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) - Mounting thread 7/16-20 UNF to EN 61518 - Mounting thread M10 to DIN 19213 - Male thread M20 x 1.5 • Male thread ½-14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting <sup>7</sup> )  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)*8) - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex la + Ex d + Zone 1D/2D)**9*11) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)*1) • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)*8 • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)*8 • Screwed gland M20x1.5 • Screwed gland (2=14 NPT)  Han 7D plug (plastic housing) incl. mating connector 12									
• Stainless steel oval flange with process connection (Oval flange has no female thread)  - Mounting thread <sup>7</sup> / <sub>16</sub> -20 UNF to EN 61518  - Mounting thread M10 to DIN 19213  - Mounting thread M12 to DIN 19213  • Male thread M20 x 1.5  • Male thread M20 x 1.5  • Male thread ½ -14 NPT  Non-wetted parts materials  • Housing made of die-cast aluminium  • Housing stainless steel precision casting <sup>7</sup> )  Version  • Standard version, German plate inscription, setting for pressure unit: bar  • International version, English plate inscription, setting for pressure unit: bar  • Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection  • None  • With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)* <sup>8</sup> )  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)* <sup>9311</sup> )  • FM + CSA intrinsic safe (is)  • FM + CSA intrinsic safe (is)  • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11</sup> )  • With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)* <sup>8</sup> • Screwed gland Pg 13.5 <sup>12</sup> )  • Screwed gland M20x1.5  • Screwed gland ½-14 NPT  Han 7D plug (plastic housing) incl. mating connector <sup>12</sup>		⊵B to EN 837-1	•			0			
nection (Oval flange has no female thread) - Mounting thread 7/ <sub>16</sub> -20 UNF to EN 61518 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 - Male thread M20 x 1.5 • Male thread M20 x 1.5 • Male thread ½ -14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting <sup>7</sup> )  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" <sup>8</sup> - "Explosion-proof (Ex d)" <sup>8</sup> - "Intrinsic safety, and flameproof enclosure (Ex ia + Ex d)" - "Ex nA/ic (Zone 2)" <sup>10</sup> ) - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" <sup>9)</sup> • FM + CSA intrinsic safe (is) • FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11)</sup> • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)" <sup>8</sup> • Screwed gland Pg 13.5 <sup>12</sup> • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector <sup>12</sup>	• Female thread ½-14 N	NPT				1			
- Mounting thread 1/16-20 UNF to EN 61518 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 - Male thread M20 x 1.5 • Male thread M20 x 1.5 • Male thread ½ -14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting 7)  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" - "Ex nA/ic (Zone 2)" 10) - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" 11) • FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) 11) • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)" 8) • Screwed gland Pg 13.5 12) • Screwed gland M20x1.5 • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector 12)	<ul> <li>Stainless steel oval fla</li> </ul>	ange with process con-							
- Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 - Male thread M20 x 1.5 • Male thread ½ -14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting <sup>7)</sup> Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" - "Ex nA/ic (Zone 2)" - "Ex nA/ic (Zone 2)" - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" • FM + CSA intrinsic safe (is) • FM + CSA intrinsic safe (is) • FM + CSA intrinsic safe (is) • FM + CSA intrinsic safe and Explosion Proof (is + xp)" • Screwed gland Pg 13.5 12) • Screwed gland M20x1.5 • Screwed gland M20x1.5 • Screwed gland ½-14 NPT  Han 7D plug (plastic housing) incl. mating connector 12)	nection (Oval flange h	nas no female thread)							
- Mounting thread M12 to DIN 19213  • Male thread M20 x 1.5 • Male thread M20 x 1.5 • Male thread ½ -14 NPT  Non-wetted parts materials • Housing made of die-cast aluminium • Housing stainless steel precision casting <sup>7</sup> )  Version • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection • None • With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" <sup>8</sup> ) - "Ex nA/ic (Zone 2)" <sup>10)</sup> - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" <sup>9)11)</sup> • FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11)</sup> • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)" <sup>8)</sup> • Electrical connection/cable entry • Screwed gland M20x1.5 • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector <sup>12</sup>						2			
<ul> <li>Male thread M20 x 1.5</li> <li>Male thread ½ -14 NPT</li> <li>Non-wetted parts materials</li> <li>Housing made of die-cast aluminium</li> <li>Housing stainless steel precision casting<sup>7</sup>)</li> <li>Version</li> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> <li>International version, English plate inscription, setting for pressure unit: bar</li> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> <li>All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.</li> <li>Explosion protection</li> <li>None</li> <li>With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)*8)  - "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)*9)  - "Ex nA/ic (Zone 2)*10)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)*9)11)</li> <li>FM + CSA intrinsic safe (is)</li> <li>FM + CSA intrinsic safe (is)</li> <li>FM + CSA intrinsic safe (is)</li> <li>FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)*8)</li> <li>Electrical connection/cable entry</li> <li>Screwed gland Pg 13.5<sup>12</sup>)</li> <li>Screwed gland M20x1.5</li> <li>Screwed gland M20x1.5</li> <li>Screwed gland (plastic housing) incl. mating connector 12</li> </ul>	<ul> <li>Mounting thread M1</li> </ul>	0 to DIN 19213				3			
Male thread ½ -14 NPT  Non-wetted parts materials  Housing made of die-cast aluminium Housing stainless steel precision casting <sup>7</sup> )  Version  Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection  None  With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" - "Ex nA/ic (Zone 2)" 10) - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)" 9111)  FM + CSA intrinsic safe (is) FM + CSA intrinsic safe (is) FM + CSA (is + ep) + Ex ia + Ex d (ATEX) 111)  With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)" 8)  Electrical connection/cable entry Screwed gland Pg 13.5 12) Screwed gland M20x1.5 Screwed gland M20x1.5 Screwed gland ½-14 NPT Han 7D plug (plastic housing) incl. mating connector 12)	•								
Non-wetted parts materials  Housing made of die-cast aluminium Housing stainless steel precision casting <sup>7</sup> )  Version Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection None With ATEX, Type of protection: - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)" <sup>8</sup> ) - "Intrinsic safety, and flameproof enclosure" (Ex ia + Ex d)" <sup>9</sup> - "Ex nA/ic (Zone 2)" <sup>10</sup> - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" <sup>9)11</sup> FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11</sup> S With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)" <sup>8</sup> FCElectrical connection/cable entry Screwed gland Pg 13.5 <sup>12</sup> Screwed gland M20x1.5 Screwed gland ½-14 NPT Han 7D plug (plastic housing) incl. mating connector 12						5			
<ul> <li>Housing made of die-cast aluminium</li> <li>Housing stainless steel precision casting<sup>7)</sup></li> <li>Version</li> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> <li>International version, English plate inscription, setting for pressure unit: bar</li> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> <li>All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.</li> <li>Explosion protection</li> <li>None</li> <li>With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)*8)  - "Intrinsic safety, and flameproof enclosure" (Ex ia + Ex d)*9)  - "Ex nA/ic (Zone 2)*10)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)*9)11)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)*1)</li> <li>With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)*8)</li> <li>NC</li> <li>Electrical connection/cable entry</li> <li>Screwed gland Pg 13.5*12)</li> <li>Screwed gland M20x1.5</li> <li>Screwed gland M20x1.5</li> <li>Screwed gland ½-14 NPT</li> <li>Han 7D plug (plastic housing) incl. mating connector 12)</li> </ul>	<ul> <li>Male thread ½ -14 NP</li> </ul>	'T				6			
<ul> <li>Housing stainless steel precision casting<sup>7</sup>)</li> <li>Version</li> <li>Standard version, German plate inscription, setting for pressure unit: bar</li> <li>International version, English plate inscription, setting for pressure unit: bar</li> <li>Chinese version, English plate inscription, setting for pressure unit: Pascal</li> <li>All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.</li> <li>Explosion protection</li> <li>None</li> <li>With ATEX, Type of protection:  - "Intrinsic safety (Ex ia)"  - "Explosion-proof (Ex d)"<sup>8</sup>)  - "Intrinsic safety, and flameproof enclosure" (Ex ia + Ex d)"<sup>9</sup>)  - "Ex nA/ic (Zone 2)"<sup>10</sup>)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"<sup>9</sup>)11)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)<sup>11</sup>)</li> <li>With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)"<sup>8</sup>)</li> <li>Filectrical connection/cable entry</li> <li>Screwed gland Pg 13.5<sup>12</sup>)</li> <li>Screwed gland M20x1.5</li> <li>Screwed gland ½-14 NPT</li> <li>Han 7D plug (plastic housing) incl. mating connector <sup>12</sup></li> </ul>									
Version  Standard version, German plate inscription, setting for pressure unit: bar  International version, English plate inscription, setting for pressure unit: bar  Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with documentation for SITRANS P in German, English, French, Italian and Spanish. Includes Compact operating instructions in 21 EU languages.  Explosion protection  None  With ATEX, Type of protection:  "Intrinsic safety (Ex ia)"  "Explosion-proof (Ex d)" <sup>8</sup> )  "Intrinsic safety, and flameproof enclosure" (Ex ia + Ex d)" <sup>9</sup> )  "Ex nA/ic (Zone 2)" <sup>10</sup> )  "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" <sup>9</sup> )11)  FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11</sup> )  With FM + CSA, Type of protection:  "Intrinsic Safe and Explosion Proof (is + xp)" <sup>8</sup> )  NC  Electrical connection/cable entry  Screwed gland Pg 13.5 <sup>12</sup> )  Screwed gland M20x1.5  Screwed gland M20x1.5  Screwed gland ½-14 NPT  Han 7D plug (plastic housing) incl. mating connector 12)									
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- "Ex nA/ic (Zone 2)*10)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)*9*11)  • FM + CSA intrinsic safe (is)  • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)*11)  • With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)**8  • Screwed gland Pg 13.5*12)  • Screwed gland Pg 13.5*12  • Screwed gland M20x1.5  • Screwed gland ½-14 NPT  • Han 7D plug (plastic housing) incl. mating connector 12)	- "Explosion-proof (Ex	(d)" <sup>8)</sup>						ı	D
- "Ex nA/ic (Zone 2)*10)  - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)*9*11)  • FM + CSA intrinsic safe (is)  • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)*11)  • With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)**8  • Screwed gland Pg 13.5*12)  • Screwed gland Pg 13.5*12  • Screwed gland M20x1.5  • Screwed gland ½-14 NPT  • Han 7D plug (plastic housing) incl. mating connector 12)	- "Intrinsic safety and	flameproof enclosure"							Р
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)***911)  • FM + CSA intrinsic safe (is)  • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)**1)  • With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)**8  • Screwed gland Pg 13.5**12)  • Screwed gland Pg 13.5**12)  • Screwed gland M20x1.5  • Screwed gland ½-14 NPT  • Han 7D plug (plastic housing) incl. mating connector 12)	(Ex ia + Ex d)"9)	٦١							
and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)**9\frac{11}{2}\)  • FM + CSA intrinsic safe (is)  • FM + CSA (is + ep) + Ex ia + Ex d (ATEX)**1  • With FM + CSA, Type of protection:  - "Intrinsic Safe and Explosion Proof (is + xp)**8  • Corewed gland Pg 13.5**12  • Screwed gland M20x1.5  • Screwed gland M20x1.5  • Screwed gland ½-14 NPT  • Han 7D plug (plastic housing) incl. mating connector 12	- "Ex nA/ic (Zone 2)" 10	<i>,</i> , , , , , , , , , , , , , , , , , ,	_						
• FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11)</sup> • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)**8 ■  Electrical connection/cable entry • Screwed gland Pg 13.5 <sup>12)</sup> • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector 12)	- "Intrinsic safety, exp	losion-proof enclosure							R
• FM + CSA intrinsic safe (is) • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11)</sup> • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)**8 ■  Electrical connection/cable entry • Screwed gland Pg 13.5 <sup>12)</sup> • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector 12)	Zone 1D/2D) <sup>(9)11)</sup>	ororection (Ex Ia+ Ex d +							
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>11)</sup> • With FM + CSA, Type of protection: - "Intrinsic Safe and Explosion Proof (is + xp)**8  ■ NC  Electrical connection/cable entry • Screwed gland Pg 13.5 <sup>12)</sup> • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector 12)	• FM + CSA intrinsic sa	fe (is)							F
<ul> <li>With FM + CSA, Type of protection:         <ul> <li>"Intrinsic Safe and Explosion Proof (is + xp)"<sup>8)</sup></li> </ul> </li> <li>Screwed gland Pg 13.5<sup>12</sup>)         <ul> <li>Screwed gland M20x1.5</li> <li>Screwed gland ½-14 NPT</li> <li>Han 7D plug (plastic housing) incl. mating connector <sup>12</sup></li> </ul> </li> </ul>	• FM + CSA (is + ep) +	Ex ia + Ex d $(ATEX)^{11}$							S
- "Intrinsic Safe and Explosion Proof (is + xp)"8) ■  Electrical connection/cable entry  • Screwed gland Pg 13.5 <sup>12)</sup> • Screwed gland M20x1.5 • Screwed gland ½-14 NPT • Han 7D plug (plastic housing) incl. mating connector <sup>12)</sup> D									
Screwed gland Pg 13.5 <sup>12)</sup> Screwed gland M20x1.5 Screwed gland ½-14 NPT Han 7D plug (plastic housing) incl. mating connector <sup>12)</sup> A  A  B  B  C  C  C  D			()						NC
<ul> <li>Screwed gland M20x1.5</li> <li>Screwed gland ½-14 NPT</li> <li>Han 7D plug (plastic housing) incl. mating connector<sup>12</sup></li> </ul>									
Screwed gland ½-14 NPT Han 7D plug (plastic housing) incl. mating connector 12  D									A
<ul> <li>Han 7D plug (plastic housing) incl. mating connector<sup>12</sup></li> </ul>	-								
connector (2)									C
connector (2)	Han 7D plug (plastic I	nousing) incl. mating							D
	connector (2)								

Selection and Ordering data		Article No.	
Pressure transmitters for absolute pressure from gauge pressure series SITRANS P DS III with HART		7 M F 4 2 3 3 -	
Display     Without display     Without visible display (display concealed, setting: mA)	•		0
With visible display (setting: mA)     with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	•		6 7

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- 1) For oxygen application, add Order code E10.
- $^{2)}\,$  Version 7MF4233-1DY... only up to max. span 200 mbar a (80 in H $_2{\rm O}$  a).
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here. If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 4) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF423.-.Y..-... and 7MF4900-1...-.B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 7) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 8) Without cable gland, with blanking plug.
- 9) With enclosed cable gland Ex ia and blanking plug.
- <sup>10)</sup>Configurations with HAN and M12 connectors are only available in Ex ic.
- 11) Only in connection with IP66.
- <sup>12)</sup>Only in connection with Ex apporval A, B or E.
- $^{13)}\mbox{Only}$  in connection with Ex apporval A, B, E or F.
- <sup>14)</sup>M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

			S	SITR	ANS
Selection and Orderin	g data	Artic	ele No	).	
	for absolute pressure				
SITRANS P DS III with P		7 M I	F 4 2 3	21.	
	OUNDATION Fieldbus (FF)		F 4 2 3		
	No. for the online configu-				
Measuring cell filling	Measuring cell				
Silicone oil	cleaning normal	1			
Inert liquid <sup>1)</sup>	grease-free to	3			
	cleanliness level 2				
Nominal measuring ra	_				
250 mbar a 1300 mbar a	(3.62 psia) (18.85 psia)	D F			
5 bar a	(72.5 psia)	G			
30 bar a	(435 psia)	Н			
Wetted parts materials					
Seal diaphragm	Process connection				
Stainless steel	Stainless steel		A 3		
Hastelloy Hastelloy	Stainless steel Hastelloy		3		
Version as diaphragm s	seal <sup>2) 3) 4) 5) 6)</sup>		7		
Process connection					
• Connection shank G1/2	2B to EN 837-1		0		
• Female thread ½-14 N			1		
Stainless steel oval flation (Oval flange has a	ange with process connec-				
	6-20 UNF to IEC 61518		2		
<ul> <li>Mounting thread M1</li> </ul>	0 to DIN 19213		3		
- Mounting thread M1			4		
<ul> <li>Male thread M20 x 1.5</li> <li>Male thread ½ -14 NF</li> </ul>			5 6		
Non-wetted parts mate			Ľ		
Housing made of die-			0		
Housing stainless stee	el precision casting		3		
Version					
<ul> <li>Standard version, Ger setting for pressure ur</li> </ul>				1	
	English plate inscription,			2	
setting for pressure un	nit: bar				
<ul> <li>Chinese version, Engli setting for pressure un</li> </ul>	sh plate inscription,			3	
All versions include DVD					
	English, French, Italian and				
in 21 EU languages.	pact operating instructions				
Explosion protection		-			
None     None	-441			Α	
<ul> <li>With ATEX, Type of pr</li> <li>"Intrinsic safety (Exit</li> </ul>				В	
- "Explosion-proof (Ex				D	
- "Intrinsic safety and	flameproof enclosure"			Р	
				_	
- "Ex nA/ic (Zone 2)" <sup>9</sup>	osion-proof enclosure and			E R	
dust explosion prote	ection (Ex ia + Ex d + not for DS III FF)			n	
				_	
<ul><li>FM + CSA intrinsic sa</li><li>FM + CSA (is + ep) +</li></ul>				F S	
• With FM + CSA, Type				ď	
	explosion Proof (is + xp)"7)			N	
Electrical connection/	•				
Screwed gland M20 x     Screwed gland 1/4 14					3
<ul> <li>Screwed gland ½-14</li> <li>M12 connectors (stair</li> </ul>	nless steel) <sup>11) 12)</sup>				C F
WILL SOURCOIDIS (Stall					

Selection and Ordering data	Article No.	
Pressure transmitters for absolute pressure from gauge pressure series		
SITRANS P DS III with PROFIBUS PA (PA)	7 M F 4 2 3 4 -	
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7 M F 4 2 3 5 -	
Display		
Without display		0
Without visible display		1
(display concealed, setting: bar)		
<ul> <li>With visible display (setting: bar)</li> </ul>		6
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>		7
- 1/		

- Included in delivery of the device:
   Brief instructions (Leporello)
   DVD with detailed documentation
- 1) For oxygen application, add Order code E10.
- 2) Version 7MF4233-1DY... only up to max. span 200 mbar a (2.9 psia).
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified
- 4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included wiht the transmitter order number, for example 7MF423.-..Y..-.... and 7MF4900-1...-.B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 7) Without cable gland, with blanking plug.
- 8) With enclosed cable gland Ex ia and blanking plug.
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- <sup>11)</sup>Only in connection with Ex approval A, B, E or F.
- <sup>12)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

Selection and Ordering data		Order	code		
Further designs		Oraci	HART	ΡΔ	FF
Add "-Z" to Article No. and specify Order					•
code.					
Pressure transmitter with mounting					
bracket (1x fixing angle, 2 x nut, 2 x U- washer or 1 x bracket, 2 x nut, 2 x U- washer) made of:					
• Steel	•	A01	1	1	1
Stainless steel	•	A02	✓	✓	✓
Plug					
• Han 7D (metal)		A30	✓		
<ul> <li>Han 8D (instead of Han 7D)</li> </ul>		A31	✓		
Angled		A32	✓		
Han 8D (metal)		A33	✓		
Cable sockets for M12 connectors (metal (CuZn))		A50	✓	✓	✓
Rating plate inscription (instead of Ger-					
man)			,	,	,
• English		B11	<b>√</b>	<b>*</b>	1
• French		B12	1	<b>✓</b>	1
<ul><li>Spanish</li><li>Italian</li></ul>		B13 B14	<b>√</b>	<b>√</b>	<b>√</b>
		B16	<b>V</b>	<b>*</b>	<b>V</b>
Cyrillic (russian)  - The state of the			1	· /	1
English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi	_	B21	•	•	•
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup>	•	C11	✓	✓	✓
Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1	•	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	•	C14	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	•	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		C21 <sup>3)</sup>		✓	
Functional safety (SIL2/3)	•	C23	1		
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration					
Device passport Russia		C99	✓	✓	✓
Setting of upper limit of output signal to		D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)		D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)		D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange		D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓
Use in or on zone 1D/2D		E01	✓	✓	✓
(only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP65)					
Oxygen application		E10	1	1	1
(In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))		_,,			
Export approval Korea		E11	1	1	1
Export approval Notea		_11	7	•	•

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
CRN approval Canada (Canadian Registration Number)	E22	1	✓	1
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil)	E25 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4				
"Flameproof" explosion protection according to INMETRO (Brazil)	E26 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4)	4)			
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4P)	E28 <sup>4)</sup>	<b>V</b>	✓	
,	E45 <sup>4)</sup>	1	1	1
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4B)		·	•	•
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4D)	E46 <sup>4)</sup>	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>4)</sup>	1	✓	✓
(only for transmitter 7MF4B)	4)			
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4D)	E56 <sup>4)</sup>	<b>V</b>	✓	<b>√</b>
Explosion-proof "Zone 2" to NEPSI	E57 <sup>4)</sup>	1	1	1
(China) (only for transmitter 7MF4E)				
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)	E70 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>5)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	1	✓	✓
Transient protector 6 kV (lightning protection)	J01	1	✓	✓
Oval flange NAM (ASTAVA)	J06	✓	✓	✓

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
- 4) Option does not include ATEX approval, but instead includes only the country-specific approval.
- 5) Approval pending.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from gauge pressure series)

Selection and Ordering data	Order	codo		
Additional data	Ordel	HART	РΔ	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.		IIIAII I		••
Measuring range to be set  Specify in plain text (max. 5 characters): Y01: up to mbar a, bar a, kPa <sub>abs</sub> , MPa <sub>abs</sub> , psia <sup>2</sup> )	Y01	<b>√</b>	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)	Y16	✓	✓	✓
Max. 27 characters, specify in plain text: Y16:				
Entry of HART address (TAG)	Y17	✓		
Max. 8 characters, specify in plain text: Y17:				
Setting of pressure indication in pres-	Y21	✓	✓	✓
sure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note: The following pressure units can be selected:				
bar, mbar, mm $H_2O^*$ ), $inH_2O^*$ ), $ftH_2O^*$ ), $mmHG$ , $inHG$ , $psi$ , $Pa$ , $RPa$ , $MPa$ , $g/cm^2$ , $RPa$ , $R$				
Setting of pressure indication in non-pressure units <sup>3)</sup> Specify in plain text: Y22: up to I/min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	<b>√</b>		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 100 s)	Y30	1	✓	✓

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>2)</sup> Only absolute pressure units selectable. Negative pressure values not permitted.

 $<sup>^{\</sup>rm 3)}$  Preset values can only be changed over SIMATIC PDM.

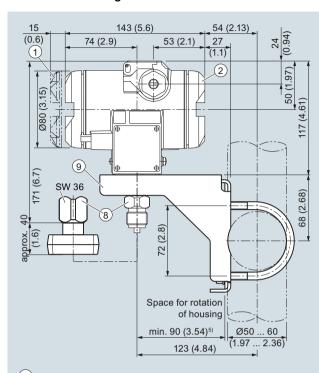
approx. 96 (3.78)

#### **Pressure Measurement**

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for absolute pressure (from gauge pressure series)

#### Dimensional drawings



- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)

17 (0.67) 29 (1.14)4)

(3)

(4)

120 (4.72)

84 (3.31)

(6)

 $\oplus$ 

176 (6.93)

237 (9.33)

8 Process connection: Connection shank G½B or Oval flange

**(**1)

105 (4.13)

(9) Mounting bracket (option)

- 1 Electronic side, digital display (longer overall length for cover with window)1)
- 2 Terminal side<sup>1)</sup>
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)2)3), Screwed gland M20 x 1,5 or Screwed gland 1/2-14 NPT or Han 7D/Han 8D2)3)plug
- 4 Harting adapter
- Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
   Not with type of protection "Explosion-proof enclosure"
- Not with type of protection "FM + CSA" [IS + XP]" For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- 5) Minimum distance for rotating

SITRANS P DS III pressure transmitters for absolute pressure, from the pressure series, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for absolute pressure (from differential pressure series)

# Technical specifications

SITRANS P, DS III for absolute pressure (from the differential	al pressure series)				
Input					
Measured variable	Absolute pressure				
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus			
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)		
	8.3 250 mbar a 0.83 25 kPa a 3 100 inH <sub>2</sub> O a	250 mbar a 25 kPa a 100 inH <sub>2</sub> O a	32 bar a 3.2 MPa a 464 psia		
	43 1300 mbar a 4.3 130 kPa a 17 525 inH <sub>2</sub> O a	1300 mbar a 130 kPa a 525 inH <sub>2</sub> O	32 bar a 3.2 MPa a 464 psia		
	160 5000 mbar a 16 500 kPa a 2.32 72.5 psia	5000 mbar a 500 kPa a 72.5 psia	32 bar a 3.2 MPa a 464 psia		
	1 30 bar a 0.1 3 MPa a 14.5 435 psia	30 bar a 3 MPa a 435 psia	160 bar a 16 MPa a 2320 psia		
	5.3 100 bar a 0.5 10 MPa a 76.9 1450 psia	100 bar a 10 MPa a 1450 psia	160 bar a 16 MPa a 2320 psia		
Lower measuring limit					
Measuring cell with silicone oil filling	0 mbar a/3 kPa a/0.4	14 psia			
Measuring cell with inert filling liquid					
- for process temperature -20 °C < $9 \le$ +60 °C (-4 °F < $9 \le$ +140 °F)	30 mbar a/0 kPa a/0	psia			
- for process temperature 60 °C < $9 \le +100$ °C (max. 85 °C for measuring cell 30 bar) (140 °F < $9 \le +212$ °C (max. 185 °C for measuring cell 435 psi))	30 mbar a + 20 mba 3 kPa a + 2 kPa a · ( 0.44 psi a + 0.29 ps	9 - 60 °C)/°C			
Upper measuring limit		ement max. 100 bar/1 e/process temperatur	0 MPa/1450 psi and 60 °C (108 °F) e)		
Start of scale value	Between the measur	ring limits (fully adjust	able)		
Output	HART		PROFIBUS PA/ FOUNDATION Fieldbus		
Output signal	4 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal		
<ul> <li>Lower limit (infinitely adjustable)</li> </ul>	3.55 mA, factory pre	eset to 3.84 mA	-		
Upper limit (infinitely adjustable)	23 mA, factory prese optionally set to 22.0		-		
Load					
Without HART	$R_{\rm B} \leq (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V				
• With HART	$R_{\rm B}$ = 230 500 $\Omega$ (SIMATIC PDM) or $R_{\rm B}$ = 230 1100 $\Omega$ (HART Communicator)				
Physical bus	- IEC 61158-2				
Protection against polarity reversal		nort-circuit and polarit ainst the other with m			
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	s)			

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for absolute pressure (from differential pressure series)

SITRANS P, DS III for absolute pressure (from the differenti	al pressure series)
Measuring accuracy	Acc. to IEC 60770-1
Reference conditions (All error data refer always refer to the set span)	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Silicone oil filling</li> <li>Room temperature 25 °C (77 °F)</li> </ul>
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span or nom. pressure range
Error in measurement at limit setting incl. hysteresis and reproducibility	
Linear characteristic	
- r ≤ 10	≤ 0.1 %
- 10 < r ≤ 30	≤ 0.2 %
Influence of ambient temperature (in percent per 28 °C (50 °F))	
• 250 mbar/25 kPa/3.6 psi	$\leq$ (0.15 · r + 0.1) %
• 1300 mbar a/130 kPa a/18.8 psia 5 bar /500 kPa a/72.5 psia 30 bar /3000 kPa a/435 psia 100 bar /10 MPa a/1450 psia 160 bar /16 MPa a/2321 psia 400 bar /40 MPa a/5802 psia 700 bar /50 MPa a/10152 psia	$\leq$ (0.08 · r + 0.16) %
Long-term stability (temperature change ± 30 °C (± 54 °F))	$\leq$ (0.25 · r) % in 5 years
Effect of mounting position (in pressure per change in angle)	≤ 0.7 mbar/0.07 kPa/0.001015 psi per 10° inclination (zero point correction is possible with position error compensation)
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 ⋅ 10 <sup>-5</sup> of nominal measuring range
Rated conditions	
Degree of protection (to IEC 60529)	IP66 (optional IP66/IP68), NEMA 4X
Temperature of medium	
<ul> <li>Measuring cell with silicone oil filling</li> </ul>	-40 +100 °C (-40 +212 °F)
Measuring cell with inert filling liquid	-20 +100 °C (-4 +212 °F)
• In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)
Ambient conditions	
Ambient temperature	
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 +185 °F)
- Display readable	-30 +85 °C (-22 +185 °F)
Storage temperature	-50 +85 °C (-58 +185 °F)
Climatic class	
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for use in the tropics
Electromagnetic Compatibility	
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for absolute pressure (from differential pressure series)

SITRANS P, DS III for absolute pressure (from the differen	tial pressure series)				
Design					
Weight (without options)	≈ 4.5 kg (≈ 9.9 (lb)				
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408				
Wetted parts materials					
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Fmat. no. 2.4360, tantalum or gold	Hastelloy C276, mat. no. 2.4819, Monel,			
Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy 2.4360	/ C4, mat. no. 2.4610 or Monel, mat. no.			
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEP	M and NBR			
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxigen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))				
Process connection	$^{1}\!\!\!/_{16}$ -18 NPT and flange connection with mounting thread M10 to DIN 19213 or $^{7}\!\!\!/_{16}$ -20 UNF to IEC 61518				
Material of mounting bracket					
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated				
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS	3304)			
Power supply $U_{H}$	HART	PROFIBUS PA/FOUNDATION Fieldbus			
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-			
Power supply		Supplied through bus			
Separate 24 V power supply necessary	-	No			
Bus voltage					
• Not Ex	-	9 32 V			
With intrinsically-safe operation	-	9 24 V			
Current consumption					
Basic current (max.)	-	12.5 mA			
• Start-up current ≤ basic current	-	Yes			
Max. current in event of fault	-	15.5 mA			
Fault disconnection electronics (FDE) available	-	Yes			

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for absolute pressure (from differential pressure series)

#### SITRANS P, DS III for absolute pressure (from the differential pressure series) PROFIBUS PA/ FOUNDATION Fieldbus HART Certificates and approvals Classification according to PED 97/23/EC For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice) Explosion protection Intrinsic safety "i" PTB 13 ATEX 2007 X Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb - Marking -40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 - Permissible ambient temperature - Connection To certified intrinsically-safe circuits with FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ peak values: $U_{\rm i} = 30 \text{ V}, I_{\rm i} = 100 \text{ mA}, P_{\rm i} = 750 \text{ mW}; R_{\rm i} = 300 \Omega$ Linear barrier: $U_{\rm o}$ = 24 V, $I_{\rm o}$ = 250 mA, $P_{\rm o}$ = 1.2 W - Effective internal inductance/capacitance $L_i = 7 \mu H, C_i = 1.1 nF$ $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ Explosion-proof "d" PTB 99 ATEX 1160 - Marking Ex II 1/2 G Ex d IIC T4/T6 Gb - Permissible ambient temperature -40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6 - Connection To circuits with values: To circuits with values: $U_{\rm H}$ = 9 ... 32 V DC H = 10.5 ... 45 V DC Dust explosion protection for zone 20 PTB 01 ATEX 2055 Ex II 1 D Ex ta IIIC T120°C Da - Marking Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db - Permissible ambient temperature -40 ... +85 °C (-40 ... +185 °F) 120 °C (248 °F) - Max. surface temperature - Connection To certified intrinsically-safe circuits with FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ peak values: $U_{\rm i} = 30 \text{ V}, I_{\rm i} = 100 \text{ mA},$ $P_{\rm i} = 750 \text{ mW}, R_{\rm i} = 300 \Omega$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1.2 \text{ W}$ $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ - Effective internal inductance/capacitance $L_i = 7 \mu H, C_i = 1.1 nF$ Dust explosion protection for zone 21/22 PTB 01 ATEX 2055 - Marking Ex II 2 D Ex tb IIIC T120°C Db To circuits with values: $U_{\rm H}$ = 10.5 ... 45 V DC; $P_{\rm max}$ = 1.2 W To circuits with values: $U_{\rm H} = 9 \dots 32 \text{ V DC}; P_{\rm max} = 1 \text{ W}$ - Connection Type of protection "n" (zone 2) PTB 13 ATFX 2007 X - Marking Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc $U_{\rm m} = 45 \text{ V}$ - Connection (Ex nA) $U_{\rm m} = 32 \text{ V}$ FISCO supply unit ic: - Connection (Ex ic) To circuits with values: $U_{i} = 45 \text{ V}$ $U_0 = 17.5 \text{ V}, I_0 = 570 \text{ mA}$ Linear barrier: $U_{\rm o} = 32 \; {\rm V}, \; I_{\rm o} = 132 \; {\rm mA}, \; P_{\rm o} = 1 \; {\rm W}$ $L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$ $L_i = 7 \mu H, C_i = 1.1 nF$ - Effective internal inductance/capacitance Certificate of Compliance 3008490 Explosion protection acc. to FM - Identification (XP/DIP) or (IS); (NI) CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC

- Explosion protection to CSA
- Identification (XP/DIP) or (IS)

T4...T6:

CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Transmitters for applications with advanced requirements (Advanced)

	SITRANS P D	S III for absolute pressure (from	differential pressure series)
HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	
PROFIBUS PA communication Simultaneous communication with	4	- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
master class 2 (max.)		- Electrical damping, adjustable	0 to 100 s
The address can be set using	Configuration tool or local opera- tion (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage	,	- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or 10 (two measured values)	Liveit we emiteuring	value)
• Input byte	0, 1, or 2 (register operating mode and reset function for	- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively
Internal preprocessing	metering)	<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Standard FOUNDATION Field- bus function block
	3.0, class B	<ul> <li>Physical block</li> </ul>	1 resource block
Function blocks  • Analog input	2	Transducer blocks	1 transducer block Pressure with calibration. 1 transducer block
- Adaptation to customer-specif-	Yes, linearly rising or falling characteristic	Pressure transducer block	LCD
ic process variables - Electrical damping, adjustable	0 100 s	- Can be calibrated by applying	Yes
- Simulation function	Input /Output	two pressures	100
- Failure mode	parameterizable (last good	- Monitoring of sensor limits	Yes
- Tallule Mode	value, substitute value, incorrect value)	<ul> <li>Simulation function: Measured pressure value, sensor temper- ature and electronics tempera-</li> </ul>	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ture	
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
<ul> <li>Physical block</li> </ul>	1		

Transducer blocks

two pressures

characteristic with - Square-rooted characteristic for flow measurement - Gradual volume suppression

sor temperature

• Pressure transducer block - Can be calibrated by applying

- Monitoring of sensor limits

- Specification of a container

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

2

Yes

Yes

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from differential pressure series)

Selection and Orderin	g data		Article	Nc	).	
Pressure transmitters	for absolute pressure		7 M F 4	1 3 3	3	•
from differential pressure series, SITRANS P DS III with HART						Ŧ.
✓ Click on the Article New ration in the PIA Life	No. for the online configu- Cycle Portal.					
Measuring cell filling	Measuring cell cleaning					
Silicone oil	normal		1			
Inert liquid <sup>1)</sup>	grease-free to cleanliness level 2		3			
Measuring span (min.						
8.3 250 mbar a 43 1300 mbar a	(0.12 3.62 psia)		D F			
0.16 5 bar a	(0.62 18.85 psia) (2.32 72.5 psia)		G			
1 30 bar a	(14.5 435 psia)		Н			
5.3 100 bar a	(76.9 1450 psia)		ΚE			
Wetted parts materials	3					
Seal diaphragm	Parts of measuring cell					
Stainless steel	Stainless steel		A			
Hastelloy	Stainless steel		В			
Hastelloy	Hastelloy		C			
Tantalum Monel	Tantalum		E			
Gold	Monel Gold		- 7			
Gold Version for diaphragm s	seal <sup>2) 3) 4) 5) 6)</sup>		Y			
Process connection		_				
	T with flange connection					
<ul> <li>Sealing screw opposit</li> </ul>						
	- -20 UNF to EN 61518		:	2		
- Mounting thread M1				)		
(only for replacemen						
• Vent on side of proces	ss flange ()					
<ul> <li>Mounting thread '/<sub>16</sub></li> <li>Mounting thread M1</li> </ul>	<sub>3</sub> -20 UNF to EN 61518					
(only for replacement			·			
Non-wetted parts mate process flange screws						
Stainless steel	Die-cast aluminum			2		
Stainless steel	Stainless steel precision casting <sup>8)</sup>			3		
Version						
<ul> <li>Standard version, Ger setting for pressure ur</li> </ul>					1	
International version,	English plate inscription,	<b></b>			2	
setting for pressure ur		•				
<ul> <li>Chinese version, Englise setting for pressure unit</li> </ul>		•			3	
All versions include DVD						
Spanish. Includes Comp	English, French, Italian and eact operating instructions					
in 21 EU languages.						
Explosion protection						
<ul><li>None</li><li>With ATEX, Type of presented and presented are also as a few presented are a few presented are also as a few presented are also a few presented are a few present</li></ul>	otection:				,	A
- "Intrinsic safety (Ex i					ı	3
- "Explosion-proof (Ex						5
- "Intrinsic safety and	flameproof enclosure"				_	5
(Ex ia + Ex d)" 10)						
- "Ex nA/ic (Zone 2)"1						
<ul> <li>"Intrinsic safety, expl dust explosion prote Zone 1D/2D)"<sup>10)12)</sup></li> </ul>	osion-proof enclosure and ection (Ex ia+ Ex d +				ļ	₹
• FM + CSA intrinsic sa	fe (is)					F
• FM + CSA (is + ep) +					,	3
<ul> <li>With FM + CSA, Type</li> <li>"Intrinsic Safe and F</li> </ul>	of protection: xplosion Proof (is + xp)" 9)					40
- Intrinsic safe and E	xpiosion Proor (is + xp)" o					١C

Selection and Ordering data	Article No.		
Pressure transmitters for absolute pressure	7MF4333-		
from differential pressure series, SITRANS P DS III with HART			
Electrical connection/cable entry			
<ul> <li>Screwed gland Pg 13.5<sup>13)</sup></li> </ul>	A	ı	
<ul> <li>Screwed gland M20 x 1.5</li> </ul>	В	}	
<ul> <li>Screwed gland ½-14 NPT</li> </ul>	C	;	
Han 7D plug (plastic housing) incl. mating connector <sup>13)</sup>	D	)	
• M12 connectors (stainless steel) <sup>14) 15)</sup>	F	:	
Display			
Without display		0	
<ul> <li>Without visible display</li> </ul>		1	
(display concealed, setting: mA)			
<ul> <li>With visible display (setting: mA)</li> </ul>		6	
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>		7	

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) For oxygen applications, add Order code E10.
- <sup>2)</sup> Version 7MF4333-1DY... only up to max. span 200 mbar a (2.9 psia).
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here
- 4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF433.-.Y..-... and 7MF4900-1...-.B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 7) Not for span "5.3 ... 100 bar a (76.9 ... 1450 psia)". Position of the top vent valve in the process flange (see dimensional drawing).
- 8) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 9) Without cable gland, with blanking plug
- $^{\rm 10)}\mbox{With enclosed cable gland Ex ia and blanking plug}$
- $^{11)}\mbox{Configurations}$  with HAN and M12 connectors are only available in Ex ic.
- <sup>12)</sup>Only in connection with IP66.
- $^{\rm 13)}\mbox{Only}$  in connection with Ex approval A, B or E.
- <sup>14)</sup>Only in connection with Ex approval A, B, E or F.
- <sup>15)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for absolute pressure (from differential pressure series)

		SITRANS P
Selection and Orderin	g data	Article No.
Pressure transmitter f	or absolute pressure	
SITRANS P DS III with F		7MF4334-
	OUNDATION Fieldbus (FF)	7MF4335-
	No. for the online configu-	
Measuring cell filling	Measuring cell	
Silicone oil	cleaning normal	1
Inert liquid <sup>1)</sup>	grease-free to	3
	cleanliness level 2	
Nominal measuring ra		D
250 mbar a 1300 mbar a	(3.62 psia) (18.85 psia)	D F
5 bar a	(72.5 psia)	G
30 bar a	(435 psia)	H
100 bar a	(1450 psia)	KE
Wetted parts materials	3	
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	В
Hastelloy	Hastelloy	C
Tantalum Monel	Tantalum Monel	H
Gold	Gold	i i
Version as diaphragm s	seal <sup>2) 3) 4) 5) 6)</sup>	Y
Process connection		
Female thread 1/4-18 NF	T with flange connection	
<ul> <li>Sealing screw opposi</li> </ul>	te process connection	
	<sub>6</sub> -20 UNF to IEC 61518	2
- Mounting thread M1		0
<ul><li>(only for replacement</li><li>Vent on side of procest</li></ul>		
	6-20 UNF to IEC 61518	
- Mounting thread M1	-	6
(only for replacement	nt requirement)	
Non-wetted parts mate process flange screws		
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision	3
	casting	
Version		
<ul> <li>Standard version, Ge setting for pressure up</li> </ul>		1
	English plate inscription,	2
setting for pressure u	nit: bar	
<ul> <li>Chinese version, Engli setting for pressure un</li> </ul>		3
Setting for pressure un All versions include DVD		
SITRANS P in German, E	English, French, Italian and	
	pact operating instructions	
in 21 EU languages.		
<ul><li>Explosion protection</li><li>None</li></ul>		A
<ul> <li>With ATEX, Type of pr</li> </ul>	otection:	
- "Intrinsic safety (Ex	(a)"	В
- "Explosion-proof (Ex		D
<ul> <li>"Intrinsic safety and (Ex ia + Ex d)" <sup>9)</sup></li> </ul>	flameproof enclosure"	P
- "Ex nA/ic (Zone 2)"	0)	E
- "Intrinsic safety, expl	osion-proof enclosure and	R
dust explosion prote	ection (Ex ia + Ex d + not for DS III FF)	
		F
<ul><li>FM + CSA intrinsic sa</li><li>FM + CSA (is + ep) +</li></ul>		S
<ul> <li>With FM + CSA, Type</li> </ul>		
	Explosion Proof (is + xp)" 8)	N C
		NC

Selection and Ordering data	Article No.
Pressure transmitter for absolute pressure from differential pressure series	
SITRANS P DS III with PROFIBUS PA (PA)	7 M F 4 3 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7 M F 4 3 3 5 -
Electrical connection/cable entry	
<ul> <li>Screwed gland M20 x 1.5</li> </ul>	В
<ul> <li>Screwed gland ½-14 NPT</li> </ul>	C
• M12 connectors (stainless steel) <sup>12)13)</sup>	F
Display	
Without display	0
Without visible display	1
(display concealed, setting: bar)	
<ul> <li>With visible display (setting: bar)</li> </ul>	6
With customer-specific display (setting as	7
specified, Order code "Y21" required)	

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) For oxygen application, add Order code E10.
- <sup>2)</sup> Version 7MF4334-1DY... only up to max. span 200 mbar a (80 inH<sub>2</sub>O a).
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included wiht the transmitter order number, for example 7MF433.-..Y..-... and 7MF4900-1...-.B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 7) Not for nominal measuring range 100 bar a (1450 psia). Position of the top vent valve in the process flange (see dimensional drawing).
- 8) Without cable gland, with blanking plug
- 9) With enclosed cable gland Ex ia and blanking plug
- <sup>10)</sup>Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>11)</sup>Only in connection with IP66.
- <sup>12)</sup>Only in connection with Ex approval A, B, E or F.
- 13)M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for absolute pressure (from differential pressure series)

Cirirano i Do in for abbolato press				ritiai
Selection and Ordering data	Order	code HART	DΛ	FF
Further designs Add "-Z" to Article No. and specify Order code.		HANI	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel	A02	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • FEP (with silicone core, approved for food)  • FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F))  • NBR (Buna N)	A20 A21 A22	* * * * * * * * * * * * * * * * * * *	* * * *	V V V
Plug	7120	·		
<ul> <li>Han 7D (metal)</li> <li>Han 8D (instead of Han 7D)</li> <li>Angled</li> <li>Han 8D (metal)</li> </ul>	A30 A31 A32 A33	✓ ✓ ✓		
<b>Sealing screw</b> 1/4-18 NPT, with valve in mat. of process flanges	A40	✓	✓	✓
Cable sockets for M12 connectors (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription				
(instead of German)  • English	B11	1	1	1
• French	B12	✓	✓	✓
• Spanish	B13	<b>V</b>	<b>V</b>	✓.
Italian     Cyrillio (russian)	B14 B16	<b>√</b>	1	1
Cyrillic (russian)     English rating plate	B21	<b>*</b>	<b>√</b>	<b>*</b>
Pressure units in inH <sub>2</sub> 0 and/or psi  Quality inspection certificate (Five-step	C11	<b>1</b>	1	
factory calibration) to IEC 60770-2 <sup>1)</sup>	CII	Ť	•	·
Inspection certificate <sup>2)</sup> Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 <sup>3)</sup>		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
Device passport Russia	C99	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	<b>✓</b>	<b>√</b>	<b>√</b>
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	<b>✓</b>
Supplied with oval flange	D37	✓	✓	✓
(1 item), PTFE packing and screws in thread of process flange		,		
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	<b>V</b>	✓	<b>V</b>

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.	<b>-</b> 04			
Use in or on zone 1D/2D  (only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP66)	E01	•	•	•
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	E10	✓	✓	✓
Export approval Korea	E11	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil)	E25 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4B)	4			
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4D)	E26 <sup>4)</sup>	<b>✓</b>	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil)	E28 <sup>4)</sup>	✓	✓	
(only for transmitter 7MF4P)				
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4B)	E45 <sup>4)</sup>	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4D)	E46 <sup>4)</sup>	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4B)				
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4D)	<b>4</b> )	,	,	
<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4E)			<b>v</b>	•
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)  (only for transmitter 7MF4R)	E58 <sup>4)</sup>	<b>V</b>	✓	<b>✓</b>
"Intrinsic safety" and "Explosion-proof"	E70 <sup>4)</sup>	1	✓	✓
explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>5)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	1	✓	✓
Interchanging of process connection side	H01	✓	✓	✓
Vent on side for gas measurements	H02	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines	H03	✓	✓	✓
(not together with K01, K02 and K04) <sup>b)</sup>				

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for absolute pressure (from differential pressure series)

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	✓
Chambered PTFE graphite gasket	J03	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>7)</sup>	J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>7)</sup>	J09	✓	✓	✓
Process flange  • Hastelloy  • Monel  • Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F) For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	K01 K02 K04	* * * *	<b>✓</b> ✓	√ √ √

When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified

<sup>7)</sup> Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar a, bar a, kPa <sub>abs</sub> , MPa <sub>abs</sub> , psia <sup>2)</sup>	Y01	<b>√</b>	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text:	Y15	✓	✓	✓
Y15:				
Measuring point text (entry in device vari-	Y16	✓	✓	✓
able) Max. 27 characters, specify in plain text: Y16:				
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	1		
Setting of pressure indication in pressure	Y21	1	1	1
units				
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi,				
Note: The following pressure units can be selected:				
bar, mbar, mm H <sub>2</sub> O*), inH <sub>2</sub> O*), ftH <sub>2</sub> O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C				
Setting of pressure indication in	Y22 +	✓		
non-pressure units <sup>3)</sup> Specify in plain text: Y22: up to I/min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y01			
Preset bus address	Y25		1	1
possible between 1 and 126 Specify in plain text: Y25:				
Damping adjustment in seconds (0 100 s)	Y30	1	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

<sup>2)</sup> If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

<sup>&</sup>lt;sup>3)</sup> Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

<sup>&</sup>lt;sup>4)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>5)</sup> Approval pending.

<sup>6)</sup> Not suitable for connection of remote seals.

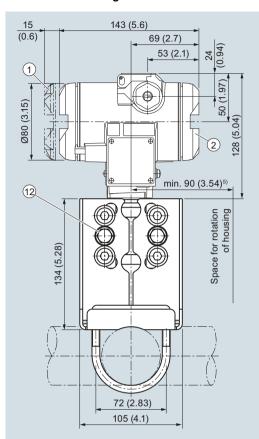
Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
Only absolute pressure units selectable. Negative pressure values not per-

<sup>3)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for absolute pressure (from differential pressure series)

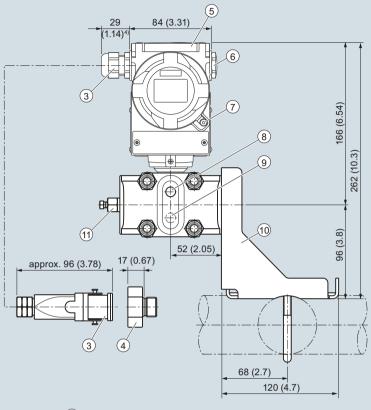
### Dimensional drawings



- 1 Electronic side, digital display (longer overall length for cover with window)1)
- 2 Terminal side<sup>1)</sup>
- 3 Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)2)3), Screwed gland M20 x 1,5 or Screwed gland 1/2-14 NPT or Han 7D/ Han 8D2)3)plug
- 4 Harting adapter
- 5 Protective cover over keys

- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Lateral venting for liquid measurement (Standard)
- 9 Lateral venting for gas measurement (suffix H02)
- 10 Mounting bracket (option)
- 11 Sealing screw with valve (option)
- 12) Process connection: 1/4-18 NPT (IEC 61518)
- Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- Not with type of protection "Explosion-proof enclosure" Not with type of protection "FM + CSA" [IS + XP]"
- For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P DS III pressure transmitters for absolute pressure, from the differential pressure series, dimensions in mm (inch)



Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

### Technical specifications

#### SITRANS P. DS III for differential pressure and flow

#### Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Differential pressure and flow

HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Span	Nominal measuring range	Max. operating pressure MAWP (PS)
1 20 mbar 0.1 2 kPa 0.4 8 inH <sub>2</sub> O	20 mbar 2 kPa 8 inH <sub>2</sub> O	32 bar 3.2 MPa 464 psi
1 60 mbar 0.1 6 kPa 0.4 24 inH <sub>2</sub> O	60 mbar 6 kPa 24.1 inH <sub>2</sub> O	160 bar 16 MPa 2320 psi
2.5 250 mbar 0.2 25 kPa 1 100 inH <sub>2</sub> O	250 mbar 25 kPa 100 inH <sub>2</sub> O	
6 600 mbar 0.660 kPa 2.4 240 inH <sub>2</sub> O	600 mbar 60 kPa 240 inH <sub>2</sub> O	
16 1600 mbar 1.6 160 kPa 6.4 642 inH <sub>2</sub> O	1600 mbar 160 kPa 642 inH <sub>2</sub> O	
50 5000 mbar 5500 kPa 20 2000 inH <sub>2</sub> O	5000 mbar 500 kPa 2000 inH <sub>2</sub> O	
0.3 30 bar 0.03 3 MPa 4.35 435 psi	30 bar 3 MPa 435 psi	
2.5 250 mbar 0.2 25 kPa 1 100 inH <sub>2</sub> O	250 mbar 25 kPa 100 inH <sub>2</sub> O	420 bar 42 MPa 6091 psi
6 600 mbar 0.660 kPa 2.4 240 inH <sub>2</sub> O	600 mbar 60 kPa 240 inH <sub>2</sub> O	(500 bar/50 MPa/7250 psi can be ordered optionally with Order Code D56)
16 1600 mbar 1.6 160 kPa 6.4 642 inH <sub>2</sub> O	1600 mbar 160 kPa 642 inH <sub>2</sub> O	
50 5000 mbar 5500 kPa 20 2000 inH <sub>2</sub> O	5000 mbar 500 kPa 2000 inH <sub>2</sub> O	
0.3 30 bar 0.03 3 MPa 4.35 435 psi	30 bar 3 MPa 435 psi	

#### Lower measuring limit

- · Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid
- for process temperature -20 °C < 9  $\leq$  +60 °C (-4 °F < 9  $\leq$  +140 °F)
- for process temperature 60 °C <  $9 \le +100$  °C (max. 85 °C for measuring cell 30 bar) (140 °F <  $9 \le +212$  °C (max. 185 °C for measuring cell 435 psi))

Upper measuring limit

Start of scale value

- -100 % of max. span (-33 % with measuring cell 30 bar/3 MPa/435 psi) or 30 mbar a/3 kPa a/0.44 psia
- -100 % of max. span (-33 % with measuring cell 30 bar/3 MPa/435 psi) or 30 mbar a/3 kPa a/0.44 psia

30 mbar a + 20 mbar a · (\$ - 60 °C)/°C 3 kPa a + 2 kPa a · (\$ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (\$ - 108 °F)/°F

100 % of max. span

(for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (108 °F) ambient temperature/process temperature)

Between the measuring limits (fully adjustable)

Transmitters for applications with advanced requirements (Advanced)

SITRANS P, DS III for differential pressure and flow				
Output	HART		PROFIBUS PA/FOUNDATION Fieldbus	
Output signal	4 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory p	reset to 3.84 mA	-	
Upper limit (infinitely adjustable)		23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		
Load				
Without HART	$R_{\rm B} \leq (U_{\rm H} - 10.5 \text{ V}),$ $U_{\rm H}$ : Power supply		-	
With HART		$R_{\rm B}$ = 230 500 $\Omega$ (SIMATIC PDM) or $R_{\rm B}$ = 230 1100 $\Omega$ (HART Communicator)		
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against other with max. su		ty reversal. Each connection against the	
Electrical damping (step width 0.1 s)	Set to 2 s (0 100	) s)		
Measuring accuracy	Acc. to IEC 60770	-1		
Reference conditions (All error data refer always refer to the set span)	<ul> <li>Increasing chara</li> <li>Start-of-scale va</li> <li>Stainless steel se</li> <li>Silicone oil filling</li> <li>Room temperatu</li> </ul>	lue 0 bar/kPa/psi eal diaphragm		
Measuring span ratio r (spread, Turn-Down)	r = max. measurir	ng span/set measuring	span or nom. pressure range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic				
- 20 mbar/2 kPa/0.29 psi	r≤5: 5 < r≤10: 10 < r≤20:	$\leq 0.075 \%$ $\leq (0.0029 \cdot r + 0.07)$ $\leq (0.0045 \cdot r + 0.07)$		
- 60 mbar/6 kPa/0.87 psi	$r \le 5$ : $5 < r \le 60$ :	≤ 0.075 % ≤ (0.005 · r + 0.05) °	%	
<ul> <li>- 250 mbar/25 kPa/3.63 psi</li> <li>600 mbar/60 kPa/8.7 psi</li> <li>1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kpa/72.5 psi</li> <li>30 bar/3 MPa/435 psi</li> </ul>	r≤5: 5 <r≤100:< td=""><td colspan="3"></td></r≤100:<>			
• Square-rooted characteristic (flow > 50 %)				
- 20 mbar/2 kPa/0.29 psi	r≤5: 5 < r≤10: 10 < r≤20:	$\leq 0.075 \%$ $\leq (0.0029 \cdot r + 0.07)$ $\leq (0.0045 \cdot r + 0.07)$		
- 60 mbar/6 kPa/0.87 psi	r≤5: 5 < r≤60:	≤ 0.075 % ≤ (0.005 · r + 0.05) °	%	
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	r≤5: 5 < r≤100:	≤ 0.065 % ≤ (0.004 · r + 0.045)	%	
• Square-rooted characteristic (flow > 25 50 %)				
- 20 mbar/2 kPa/0.29 psi	$r \le 5$ : 5 < $r \le 10$ : 10 < $r \le 20$ :	≤ 0.15 % ≤ (0.0058 · r + 0.142 ≤ (0.009 · r + 0.142)		
- 60 mbar/6 kPa/0.87 psi	r ≤ 5 : 5 < r ≤ 60 :	≤ 0.075 % ≤ (0.01 · r + 0.1) %		
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	r ≤ 5 : 5 < r ≤ 100 :	≤ 0.13 % ≤ (0.008 · r + 0.09) °	%	

Transmitters for applications with advanced requirements (Advanced)

Measuring accuracy (continued)         Acc. IEC 60770-1           Influence of ambient temperature (in percent per 28 °C (50 °F))	
(in percent per 28 °C (50 °F))  • 20 mbar/2 kPa/0.29 psi ≤ (0.15 ⋅ r + 0.1) %  • 60 mbar/6 kPa/0.87 psi ≤ (0.075 ⋅ r + 0.1) %  • 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi 1nfluence of static pressure  • on the zero point  • 20 mbar/2 kPa/0.29 psi ≤ (0.15 ⋅ r) % per 32 bar (zero-point correction is possible with position error adjustment)  • 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi 5 combar/25 kPa/3.3 psi 5 combar/3 MPa/435 psi 5 combar/3 MPa/435 psi 5 combar/3 MPa/435 psi 5 combar/3 kPa/3.21 psi 5 combar/3 kPa/3.25 psi 30 bar/3 MPa/435 psi 5 combar/3 kPa/3.21 psi 5 combar/3 kPa/3.25 psi 30 bar/3 MPa/435 psi 5 combar/3 kPa/3.25 p	
• 60 mbar/6 kPa/0.87 psi  • 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  Influence of static pressure  • on the zero point  - 20 mbar/2 kPa/0.29 psi  - 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  - 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  - 60 mbar/6 kPa/0.87 psi 1600 mbar/26 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/60 kPa/8.7 psi 1600 mbar/66 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/66 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
<ul> <li>250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi</li> <li>Influence of static pressure</li> <li>on the zero point</li> <li>20 mbar/2 kPa/0.29 psi</li> <li>≤ (0.15 · r) % per 32 bar (zero-point correction is possible with position error adjustment)</li> <li>60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi</li> <li>5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi</li> <li>0 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/83 psi</li> <li>0 mbar/6 kPa/0.29 psi</li> <li>0 mbar/6 kPa/0.29 psi</li> <li>0 mbar/6 kPa/0.37 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi</li> </ul>	
600 mbar/60 kPa/8.7 psi 1600 mbar/1500 kpa/72.5 psi 30 bar/3 MPa/435 psi  Influence of static pressure  • on the zero point  - 20 mbar/2 kPa/0.29 psi  - 60 mbar/6 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi   ≤ (0.15 · r) % per 32 bar (zero-point correction is possible with position error adjustment)  ≤ (0.1 · r) % per 70 bar (zero-point correction is possible with position error adjustment)  ≤ (0.1 · r) % per 70 bar (zero-point correction is possible with position error adjustment)  ≤ (0.2 · r) % per 70 bar (zero-point correction is possible with position error adjustment)  ≤ (0.2 · r) % per 70 bar (zero-point correction is possible with position error adjustment)  ≤ (0.2 · r) % per 70 bar  ≤ 0.14 % per 70 bar  ≤ 0.14 % per 70 bar  ≤ 0.14 % per 70 bar	
<ul> <li>• on the zero point</li> <li>- 20 mbar/2 kPa/0.29 psi</li> <li>≤ (0.15 · r) % per 32 bar (zero-point correction is possible with position error adjustment)</li> <li>- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi</li> <li>- 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi</li> <li>- 20 mbar/2 kPa/0.29 psi</li> <li>- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi</li> <li>- 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi</li> </ul>	
<ul> <li>20 mbar/2 kPa/0.29 psi</li> <li>≤ (0.15 · r) % per 32 bar (zero-point correction is possible with position error adjustment)</li> <li>60 mbar/6 kPa/0.87 psi (zero-point correction is possible with position error adjustment)</li> <li>≤ (0.1 · r) % per 70 bar (zero-point correction is possible with position error adjustment)</li> <li>5 bar/500 kpa/72.5 psi (zero-point correction is possible with position error adjustment)</li> <li>• on the span</li> <li>20 mbar/2 kPa/0.29 psi</li> <li>≤ (0.2 · r) % per 70 bar (zero-point correction is possible with position error adjustment)</li> <li>• on the span</li> <li>20 mbar/2 kPa/0.29 psi</li> <li>≤ 0.2 % per 32 bar</li> <li>≤ 0.14 % per 70 bar</li> <li>≤ 0.14 % per 70 bar</li> <li>≤ 0.14 % per 70 bar</li> </ul>	
(zero-point correction is possible with position error adjustment)  - 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi  - 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  - 20 mbar/2 kPa/0.29 psi  - 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/160 kPa/23.21 psi  - 60 mbar/6 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi  - 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  - 20 mbar/2 kPa/0.29 psi  - 60 mbar/66 kPa/0.87 psi 250 mbar/25 kPa/3.63 psi 600 mbar/160 kPa/23.21 psi  5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi  (zero-point correction is possible with position error adjustment)  ≤ (0.2 ⋅ r) % per 70 bar (zero-point correction is possible with position error adjustment)  ≤ 0.2 % per 32 bar  ≤ 0.14 % per 70 bar  ≤ 0.14 % per 70 bar  ≤ 0.14 % per 70 bar  Sometime in the position error adjustment is possible with posit	
30 bar/3 MPa/435 psi (zero-point correction is possible with position error adjustment)  • on the span  - 20 mbar/2 kPa/0.29 psi ≤ 0.2 % per 32 bar  - 60 mbar/6 kPa/0.87 psi ≤ 0.14 % per 70 bar  250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
- 20 mbar/2 kPa/0.29 psi ≤ 0.2 % per 32 bar  - 60 mbar/6 kPa/0.87 psi ≤ 0.14 % per 70 bar 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
- 60 mbar/6 kPa/0.87 psi ≤ 0.14 % per 70 bar 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi	
Long-term stability Static pressure max 70 bar/7 MPa/ 1015 psi	
(temperature change ± 30 °C (± 54 °F))	
• 20 mbar/2 kPa/0.29 psi ≤ (0.2 · r) % per year	
60 mbar/6 kPa/0.87 psi     30 bar/3 MPa/435 psi     ≤ (0.25 · r) % in 5 years	
• 250 mbar/25 kPa/3.63 psi ≤ (0.125 · r) % in 5 years     600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi	
Effect of mounting position (in pressure per change in angle) ≤ 0.7 mbar/0.07 kPa/0.028 inH <sub>2</sub> O per 10° inclination (zero-point correction is possible with position error adjustment)	
Effect of auxiliary power supply 0.005 % per 1 V (in percent per change in voltage)	
Measuring value resolution for PROFIBUS PA and 3 · 10 <sup>-5</sup> of nominal measuring range FOUNDATION Fieldbus	

Transmitters for applications with advanced requirements (Advanced)

STIRANS P DS III for differential pressure and flow	V			
SITRANS P, DS III for differential pressure and flow				
Rated conditions				
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X			
Temperature of medium				
Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F) -20 +10 ing cell	00 °C (-4 +212 °F) with 30 bar measur-		
<ul> <li>Measuring cell with inert filling liquid</li> </ul>	-20 +100 °C (-4 +212 °F)			
<ul> <li>In conjunction with dust explosion protection</li> </ul>	-20 +60 °C (-4 +140 °F)			
Ambient conditions				
Ambient temperature				
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 +185 °F)			
- Display readable	-30 +85 °C (-22 +185 °F)			
Storage temperature	-50 +85 °C (-58 +185 °F)			
• Climatic class				
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for us	e in the tropics		
<ul> <li>Electromagnetic Compatibility</li> </ul>				
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21			
Design				
Weight (without options)	Die-cast aluminum: $\approx$ 4.5 kg ( $\approx$ 9.9 lb) Stainless steel precision casting: $\approx$ 7.1 kg ( $\approx$ 15.6 lb)			
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408			
Wetted parts materials				
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or H mat. no. 2.4360, tantalum or gold	astelloy C276, mat. no. 2.4819, Monel,		
Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy mat. no. 2.4360	C4, mat. no. 2.4610 or Monel,		
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPI	M and NBR		
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measureme (140 °F))	nt pressure 100 bar (1450 psi) at 60 °C		
Process connection	Female thread ½-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518			
Material of mounting bracket				
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plat	ted		
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)			
Power supply $U_{\mathbb{H}}$	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-		
Power supply	-	Supplied through bus		
Separate 24 V power supply necessary	-	No		
Bus voltage				
• Not Ex	_	9 32 V		

Power supply $U_{\mathbb{H}}$	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-
Power supply		Supplied through bus
Separate 24 V power supply necessary		No
Bus voltage		
• Not Ex	-	9 32 V
With intrinsically-safe operation	-	9 24 V
Current consumption		
Basic current (max.)		12.5 mA
<ul> <li>Start-up current ≤ basic current</li> </ul>	-	Yes
Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

Transmitters for applications with advanced requirements (Advanced)

SITRANS P, DS III for differential pressure and flow	HADT	DDOFIDUO DA / FOUNDATION Fieldhio
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Classification according to PED 97/23/EC PN 32/160 (MAWP 464/2320 psi)		fluid group 1; complies with requirements o
DNI 400 (MANAID COOO ::- :)	article 3, paragraph 3 (sound engineerin	,
PN 420 (MAWP 6092 psi)	requirements of Article 3, paragraph 1 (if formity evaluation module H by the TÜV	fluid group 1; complies with basic safety appendix 1); assigned to category III, con- Nord.
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperati -40 +70 °C (-40 +158 °F) temperati -40 +60 °C (-40 +140 °F) temperati	ure class T5;
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1.2 \text{ W}$
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperati -40 +60 °C (-40 +140 °F) temperati	ure class T4; ure class T6
- Connection	To circuits with values: $U_{\rm H} = 10.5 \dots 45  \rm V  DC$	To circuits with values: $U_{\rm H} = 9 \dots 32 \text{ V DC}$
<ul> <li>Dust explosion protection for zone 20</li> </ul>	PTB 01 ATEX 2055	
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 250 \text{ mA}$ , $P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$	$L_{\rm i} = 7  \mu \text{H},  C_{\rm i} = 1.1  \text{nF}$
<ul> <li>Dust explosion protection for zone 21/22</li> </ul>	PTB 01 ATEX 2055	'
- Marking	Ex II 2 D Ex tb IIIC T120°C Db	
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 \ DC; $P_{\rm max}$ = 1.2 W	/ To circuits with values: $U_{\rm H}$ = 9 32 V DC; $P_{\rm max}$ = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	1
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	<i>U</i> <sub>m</sub> = 45 V	$U_{\rm m} = 32  {\rm V}$
- Connection (Ex ic)	To circuits with values: $U_{\rm i} = 45 \text{ V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V}$ , $I_0 = 570 \text{ mA}$ Linear barrier: $U_0 = 32 \text{ V}$ , $I_0 = 132 \text{ mA}$ , $P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$	$L_{\rm i} = 7  \mu \text{H},  C_{\rm i} = 1.1  \text{nF}$
Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	·	/ 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC / 2, GP FG; CL III
Explosion protection to CSA	Certificate of Compliance 1153651	,
- Identification (XP/DIP) or (IS)	·	/ 1, GP EFG; CL III; Ex ia IIC T4T6; CL I, P FG; CL III

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

HART communication	
HART	230 1100 Ω
Protocol	HART Version 5.x
Software for PC	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local opera- tion (standard setting address 126)
Cyclic data usage	
Output byte	5 (one measured value) or 10 (two measured values)
Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively
Physical block	1
Transducer blocks	2
Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for mea- sured pressure value and sen- sor temperature	Constant value or over parameterizable ramp function

# FOUNDATION Fieldbus communication

Function blocks

- Analog input
  - Adaptation to customerspecific process variables
- Electrical damping, adjustable
- Simulation function
- Failure mode
- Limit monitoring
- Square-rooted characteristic for flow measurement
- PID
- Physical block

Transducer blocks

- Pressure transducer block
- Can be calibrated by applying two pressures
- Monitoring of sensor limits
- Simulation function: Measured pressure value, sensor temperature and electronics temperature

3 function blocks analog input, 1 function block PID

Yes, linearly rising or falling characteristic

0 ... 100 s

Output/input (can be locked within the device with a bridge)

parameterizable (last good value, substitute value, incorrect value)

Yes, one upper and lower warning limit and one alarm limit respectively

Yes

Standard FOUNDATION Fieldbus function block

1 resource block

1 transducer block Pressure with calibration, 1 transducer block LCD

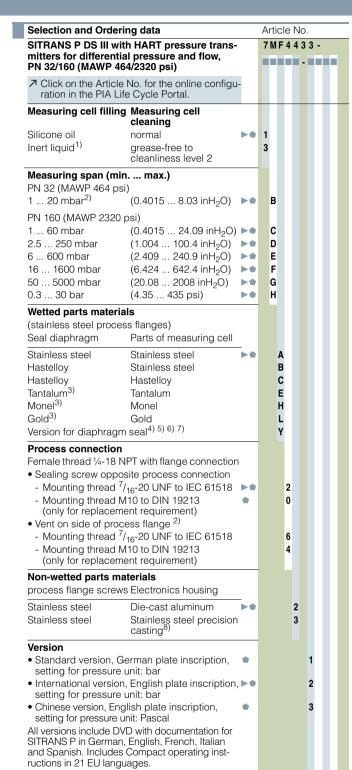
Yes

Yes

Constant value or over parameterizable ramp function

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for differential pressure and flow



Selection and Ordering data		Article No.	
SITRANS P DS III with HART pressure transmitters for differential pressure and flow,	•	7MF4433	
PN 32/160 (MAWP 464/2320 psi)			
Explosion protection			
• None			Α
<ul> <li>With ATEX, Type of protection:</li> </ul>			
- "Intrinsic safety (Ex ia)"			В
- "Explosion-proof (Ex d)" <sup>9)</sup>			D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"10)	•		P
- "Ex nA/ic (Zone 2)" <sup>11)</sup>			E
<ul> <li>"Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d - Zone 1D/2D)**10)12)</li> </ul>	<b>&gt;</b>		R
• FM + CSA intrinsic safe (is) 10)			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>12)</sup>			S
• With FM + CSA, Type of protection:	1) .		
- "Intrinsic Safe and Explosion Proof (is + xp)" <sup>5</sup>	"		NC
Electrical connection/cable entry			
<ul> <li>Screwed gland Pg 13.5<sup>13)</sup></li> </ul>			Α
<ul> <li>Screwed gland M20 x 1.5</li> </ul>			В
<ul> <li>Screwed gland ½-14 NPT</li> </ul>			С
<ul> <li>Han 7D plug (plastic housing) incl. mating connector<sup>13)14)</sup></li> </ul>			D
<ul> <li>M12 connectors (stainless steel)<sup>15)16)</sup></li> </ul>			F
Display			
Without display			0
Without visible display	<b>&gt;</b>		1
(display concealed, setting: mA)			
<ul> <li>With visible display (setting: mA)</li> </ul>			6
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22 required)</li> </ul>	•		7
A 11 1 1 1 1 1			

- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) For oxygen application, add Order code E10.
- 2) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- $^{3)}$  Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 inH $_2$ O))
- 4) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 5) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 6) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443.-.Y..-... and 7MF4900-1...-.B
- 7) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 8) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 9) Without cable gland, with blanking plug
- <sup>10)</sup>With enclosed cable gland Ex ia and blanking plug
- $^{11)}\mbox{Configurations}$  with HAN and M12 connectors are only available in Ex ic.
- 12)Only in connection with IP66.
- <sup>13)</sup>Only in connection with Ex approval A, B or E.
- <sup>14)</sup>Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>
- $^{15)}\mbox{Only}$  in connection with Ex approval A, B, E or F.
- <sup>16)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

Selection and Orde	ring data	Artic	cle N	lo.
Pressure transmitte	ers for differential pressure			
	(MAWP 464/2320 psi)			
SITRANS P DS III wit	h PROFIBUS PA (PA)	7 M	F 4 4	34-
SITRANS P DS III wit	h FOUNDATION Fieldbus (FF)	7 M	F 4 4	35-
Click on the Articl ration in the PIA L	e No. for the online configu- ife Cycle Portal.		ш	
Measuring cell fillin	g Measuring cell cleaning			
Silicone oil	normal	1		
Inert liquid <sup>1)</sup>	grease-free to cleanliness level 2	3		
Nominal measuring	range			
PN 32 (MAWP 464 p	si)			
20 mbar <sup>2)</sup>	(8.03 inH <sub>2</sub> O)	В		
PN 160 (MAWP 2320	• •			
60 mbar	(24.09 inH <sub>2</sub> O)	C		
250 mbar	(100.4 inH <sub>2</sub> O) (240.9 inH <sub>2</sub> O)	D E		
600 mbar 1600 mbar	(240.9 INH <sub>2</sub> O) (642.4 inH <sub>2</sub> O)	F		
5 bar	(642.4 INH <sub>2</sub> O) (2008 inH <sub>2</sub> O)	G		
30 bar	(435 psi)	H		
Wetted parts mater				
(stainless steel proce				
Seal diaphragm	Parts of measuring cell			
Stainless steel	Stainless steel		A	
Hastelloy	Stainless steel		В	
Hastelloy	Hastelloy		С	
Tantalum 3)	Tantalum		E	
Monel <sup>3)</sup>	Monel		H	
Gold <sup>3)</sup>	Gold		L	
Version as diaphragi		_	Y	
Process connection				
	NPT with flange connection osite process connection			
	<sup>7</sup> / <sub>16</sub> -20 UNF to IEC 61518		2	
- Mounting thread			0	
	nent requirement)			
Venting on side of	process flanges <sup>2)</sup>			
- Mounting thread	7/ <sub>16</sub> -20 UNF to IEC 61518		6	
- Mounting thread	M10 to DIN 19213		4	
	nent requirement)	-		
Non-wetted parts m process flange screv				
Stainless steel	Die-cast aluminum		2	
Stainless steel	Stainless steel precision		3	
	casting			
Version				
Standard versions				1
	n, English label inscriptions, languages on DVD			2
(no Order code sel				
	O			
Version	aerman piate inscription,			1
• Standard version, (	e unit: bar			
<ul> <li>Standard version, 0 setting for pressure</li> </ul>				2
<ul> <li>Standard version, 0 setting for pressure</li> </ul>	n, English plate inscription,			2
<ul> <li>Standard version, 0 setting for pressure</li> <li>International version setting for pressure</li> <li>Chinese version, Error</li> </ul>	n, English plate inscription, e unit: bar nglish plate inscription,			3
<ul> <li>Standard version, (setting for pressure)</li> <li>International versions setting for pressure</li> <li>Chinese version, Ersetting for pressure</li> </ul>	on, English plate inscription, e unit: bar nglish plate inscription, unit: Pascal			
<ul> <li>Standard version, (setting for pressure</li> <li>International versic setting for pressure</li> <li>Chinese version, Er setting for pressure</li> <li>All versions include D</li> </ul>	on, English plate inscription, e unit: bar aglish plate inscription, unit: Pascal VD with documentation for			
<ul> <li>Standard version, (setting for pressure)</li> <li>International version setting for pressure</li> <li>Chinese version, Er setting for pressure</li> <li>All versions include D</li> <li>SITRANS P in Germa</li> </ul>	on, English plate inscription, e unit: bar nglish plate inscription, unit: Pascal			

Selection and Ordering data	Article No.
Pressure transmitters for differential pressure and flow PN 32/160 (MAWP 464/2320 psi)	
SITRANS P DS III with PROFIBUS PA (PA)	7 M F 4 4 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7MF4435-
,	
Explosion protection	
• None	A
<ul><li>With ATEX, Type of protection:</li></ul>	
- "Intrinsic safety (Ex ia)"	В
- "Explosion-proof (Ex d)" <sup>8)</sup>	D
- "Intrinsic safety and flameproof enclosure"	P
(Ex ia + Ex d) <sup>nB)</sup> - "Ex nA/ic (Zone 2)" 10)	E
- "Intrinsic safety, explosion-proof enclosure and	B
dust explosion protection (Ex ia + Ex d +	"
dust explosion protection (Ex ia + Ex d + Zone 1D/2D)*9) 11)(not for DS III FF)	
FM + CSA intrinsic safe (is)	F
<ul> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)<sup>11)</sup></li> </ul>	S
<ul><li>With FM + CSA, Type of protection:</li></ul>	
- "Intrinsic Safe and Explosion Proof (is + xp)"8)	NC
Electrical connection/cable entry	
• Screwed gland M20 x 1.5	В
• Screwed gland ½-14 NPT	C
M12 connectors (stainless steel) <sup>12) 13)</sup>	F
Display	
Without display	0
<ul> <li>Without visible display (display concealed, setting: bar)</li> </ul>	1
With visible display (setting: bar)	6
With visible display (setting, bar)     With customer-specific display	7
(setting as specified, Order code "Y21" required)	1
(1111 J. 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) For oxygen application, add Order code E10.
- 2) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- $^{\rm 3)}$  Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 in  $\rm H_2O))$
- 4) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 5) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 6) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443.-..Y..-... and 7MF4900-1...-.B
- 7) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 8) Without cable gland, with blanking plug.
- 9) With enclosed cable gland Ex ia and blanking plug.
- $^{10)}$ Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>11)</sup>Only in connection with IP66.
- <sup>12)</sup>Only in connection with Ex approval A, B, E or F.
- <sup>13)</sup>M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data		Order	code		
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	F
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
<ul><li>Steel</li><li>Stainless steel</li></ul>	•	A01 A02	<b>√</b>	<b>√</b>	٧
O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • FEP (with silicone core, approved for food  • FFPM (Kalrez, compound 4079), for measured medium temperatures  -15 100 °C (5 212 °F)  • NBR (Buna N)	)	A20 A21 A22	* * * * * * * * * * * * * * * * * * *	<b>* * *</b>	*
plug • Han 7D (metal) • Han 8D (instead of Han 7D) • Angled • Han 8D (metal)		A30 A31 A32 A33	* * * * *	·	
Sealing screws (2 units) 1/4-18 NPT, with valve in mat. of process flanges	•	A40	✓	✓	•
Cable sockets for M12 connectors (metal (CuZn))		A50	✓	✓	,
Rating plate inscription (instead of German) • English • French • Spanish • Italian • Cyrillic (russian)	• • • • •	B12	* * * * * * * * * * * * * * * * * * *	V V V V	,
English rating plate Pressure units in inH <sub>2</sub> O and/or psi	•	B21	✓	✓	,
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup>	•	C11	✓	✓	,
Inspection certificate <sup>2)</sup> to EN 10204-3.1	•	C12	1	✓	,
Factory certificate to EN 10204-2.2	•	C14	✓	✓	,
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	•	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		C21 <sup>3)</sup>		1	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL	•	C23	✓		
conformity declaration					

OTTIANO I DO INTO AMOION	0 1			
Selection and Ordering data	Order		DA	CF
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07	✓	✓	✓
(only together with seal diaphragm made of Hastelloy and stainless steel)				
<b>Degree of protection IP66/IP68</b> (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	✓
Process flange screws made of Monel (max. nominal pressure PN20)	D34	✓	✓	✓
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	1	✓
Use in or on zone 1D/2D	E01	✓	<b>✓</b>	<b>✓</b>
(only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)"and IP66)				
Overfilling safety device for flammable and non-flammable liquids	E08	✓		
(max. PN 32 (MAWP 464 psi), basic device with type of protection "Intrinsic safety (Ex ia)", to WHG and VbF, not together with measuring cell filling "inert liquid")				
Oxygen application	E10	✓	✓	✓
(In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))				
Export approval Korea	E11	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil)	E25 <sup>4)</sup>	✓	✓	✓
(only for transmitter 7MF4B)  "Flameproof" explosion protection according to INMETRO (Brazil)	E26 <sup>4)</sup>	1	✓	✓
(only for transmitter 7MF4D)  Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil)	E28 <sup>4)</sup>	✓	✓	
(only for transmitter 7MF4P)	4)			
<b>Ex Approval IEC Ex (Ex ia)</b> (only for transmitter 7MF4B)	E45 <sup>4)</sup>	•	✓	•
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4D)	E46 <sup>4)</sup>	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4B)	E55 <sup>4)</sup>	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>4)</sup>	✓	✓	1
(only for transmitter 7MF4D)  Explosion-proof "Zone 2" to NEPSI	E57 <sup>4)</sup>	1	1	<b>✓</b>
(China) (only for transmitter 7MF4E)				
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>4)</sup>	1	✓	✓
(only for transmitter 7MF4R)  "Intrinsic safety" and "Explosion-proof"	E70 <sup>4)</sup>	1	✓	✓
explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4[B, D]Z + E11)				
[D, D]L + L   1)				

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>5)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>5)</sup>	✓	✓	1
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	1
Interchanging of process connection side	H01	✓	✓	✓
Vent on side for gas measurements	H02	✓	✓	1
Stainless steel process flanges for vertical differential pressure lines	H03	✓	✓	1
(not together with K01, K02 and K04 <sup>6)</sup>				
Transient protector 6 kV (lightning protection)	J01	✓	✓	<b>√</b>
Chambered graphite gasket for process flange	J02	✓	✓	✓
Chambered PTFE graphite gasket	J03	✓	✓	1
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>7)</sup>	J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>7)</sup>	J09	✓	1	✓
Process flange				
Hastelloy	K01	✓	✓	✓
Monel	K02	✓	✓	✓
Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F)	K04	<b>√</b>	✓	1
For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible				
<ul> <li>We can offer shorter delivery times for cont</li> </ul>	figuration	ne desir	natar	d with

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Supplementary electronics for 4-wire connection, see accessories.

- ✓ = available
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
- 4) Option does not include ATEX approval, but instead includes only the countryspecific approval.
- 5) Approval pending.
- 6) Not suitable for connection of remote seal.
- 7) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order	code		
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set  Specify in plain text:  • in the case of linear characteristic curve (max. 5 characters):  Y01: up to mbar, bar, kPa, MPa, psi  • in the case of square rooted characteristic (max. 5 characters):  Y02: up to mbar, bar, kPa, MPa, psi		✓	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable)  Max. 27 char., specify in plain text: Y16:	Y16	1	✓	✓
Entry of HART address (TAG)  Max. 8 char., specify in plain text: Y17:	Y17	✓		
Setting of pressure indicator in pressure units  Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi,  Note: The following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O*, inH <sub>2</sub> O*, ftH <sub>2</sub> O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	Y21	•	<b>✓</b>	•
Setting of pressure indicator in non-pressure units <sup>2</sup> ) Specify in plain text: Y22: up to I/min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y22 <sup>3)</sup> + Y01 or Y02	<b>√</b>		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 100 s)	Y30	✓	✓	✓

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

- ✓ = available
- 1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
- 2) Preset values can only be changed over SIMATIC PDM.
- 3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

Selection and Orderin	g data	Artio	cle	No	).	
SITRANS P DS III with	HART pressure trans-	7 M I	F 4	5 3	3	-
mitters for differential						
PN 420 (MAWP 6092 p	,					
ration in the PIA Life	No. for the online configu- Cycle Portal.					
Measuring cell filling	Measuring cell cleaning					
Silicone oil	normal	1				
Inert liquid <sup>1)</sup>	grease-free to	3				
more inquita	cleanliness level 2					
Measuring span (min.	max.)					
2.5 250 mbar	(1.004 100.4 inH <sub>2</sub> O)	D				
6 600 mbar	(2.409 240.9 inH <sub>2</sub> O)	E				
16 1600 mbar	(6.424 642.4 inH <sub>2</sub> O)	F				
50 5000 mbar	(20.08 2008 inH <sub>2</sub> O)	G				
0.3 30 bar	(4.35 435 psi)	Н				
Wetted parts material						
(stainless steel process	s flanges)					
Seal diaphragm	Parts of measuring cell					
Stainless steel	Stainless steel		A			
Hastelloy	Stainless steel		В			
Gold <sup>2)</sup>	Gold		L			
Version for diaphragm	seal <sup>3) 4) 5) 6)</sup>	ľ	Y			
Process connection						
Female thread 1/4-18 NF	PT with flange connection					
<ul> <li>Sealing screw opposit</li> </ul>	te process connection					
<ul> <li>Mounting thread <sup>7</sup>/<sub>1</sub></li> </ul>	6-20 UNF to IEC 61518		3			
<ul> <li>Mounting thread M<sup>*</sup></li> </ul>			1			
(only for replaceme						
<ul> <li>Venting on side of provent valve at top of provent valve at top of provent valve.</li> </ul>	ocess flanges, location of ocess flanges (see dimen-					
sional drawing)	ocess hanges (see dimen-					
	6-20 UNF to IEC 61518		7			
- Mounting thread M	2 to DIN 19213		5			
(only for replaceme	nt requirement)					
Non-wetted parts mat						
process flange screws						
Stainless steel	Die-cast aluminum			2		
Stainless steel	Stainless steel precision casting <sup>7)</sup>			3		
	Casting 7	_				
Version	mana and a takan tana a minaki a m					
<ul> <li>Standard version, Ge setting for pressure u</li> </ul>					1	
	English plate inscription,				2	
setting for pressure u						
• Chinese version, Engli	sh plate inscription,				3	
setting for pressure un						
	) with documentation for					
	English, French, Italian and pact operating instructions					
in 21 EU languages.	bact operating instructions					
Explosion protection						
None						Α
• With ATEX, Type of pr	otection:					
- "Intrinsic safety (Ex						В
	( d)" <sup>8)</sup>					D
- "Explosion-proof (Ex						P
- "Explosion-proof (Ex	flameproof enclosure"					
<ul> <li>"Explosion-proof (Explosion-proof)</li> <li>"Intrinsic safety and (Ex ia + Ex d)"<sup>(S)</sup></li> </ul>	flameproof enclosure"					_
<ul> <li>"Explosion-proof (Explosion)</li> <li>"Intrinsic safety and (Ex ia + Ex d)"<sup>9)</sup></li> <li>"Ex nA/ic (Zone 2)"<sup>1</sup></li> </ul>	0)					E
- "Explosion-proof (Ex  - "Intrinsic safety and (Ex ia + Ex d)*9)  - "Ex nA/ic (Zone 2)*1  - "Intrinsic safety, exp	0) losion-proof enclosure and					R
- "Explosion-proof (Ex  - "Intrinsic safety and (Ex ia + Ex d)*9)  - "Ex nA/ic (Zone 2)*1  - "Intrinsic safety, exp	0) losion-proof enclosure and					
- "Explosion-proof (Ex  - "Intrinsic safety and (Ex ia + Ex d)"9)  - "Ex nA/ic (Zone 2)"1  - "Intrinsic safety, exp dust explosion prote Zone 1D/2D)"9)11)	0) losion-proof enclosure and ection (Ex ia+ Ex d +					R
- "Explosion-proof (E) - "Intrinsic safety and (Ex ia + Ex d)") - "Ex nA/ic (Zone 2)" - "Intrinsic safety, exp dust explosion prote Zone 1D/2D)" • FM + CSA intrinsic safety	o) losion-proof enclosure and ection (Ex ia+ Ex d +					R F
- "Explosion-proof (Ex  - "Intrinsic safety and (Ex ia + Ex d)*9)  - "Ex nA/ic (Zone 2)*1  - "Intrinsic safety, exp dust explosion prote Zone 1D/2D)*9)*11)  • FM + CSA intrinsic safety + explosion prote Zone 1D/2D)*9)*11	o) losion-proof enclosure and ection (Ex ia+ Ex d +  lfe (is) Ex ia + Ex d (ATEX) <sup>11)</sup>					R
- "Explosion-proof (E) - "Intrinsic safety and (Ex ia + Ex d)") - "Ex nA/ic (Zone 2)" - "Intrinsic safety, exp dust explosion prote Zone 1D/2D)" • FM + CSA intrinsic sa	losion-proof enclosure and ection (Ex ia+ Ex d +  lefe (is) Ex ia + Ex d (ATEX) <sup>11)</sup> of protection:					R F

Selection and Ordering data Article No.	
Attorior and Ordering add	
SITRANS P DS III with HART pressure trans- 7 MF 4 5 3 3 -	
mitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	П
Electrical connection/cable entry	
Screwed gland Pg 13.5 <sup>12)</sup>	Α
Screwed gland M20x1.5	В
• Screwed gland 1/2-14 NPT	С
Han 7D plug (plastic housing) incl. mating connector <sup>12</sup> 1 <sup>13</sup> )	D
• M12 connectors (stainless steel) <sup>14)</sup> <sup>15)</sup>	F
Display	
Without display	0
Without visible display	1
(display concealed, setting: mA)	
With visible display (setting: mA)	6
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>	7
Power supply units see Chap. 7 "Supplementary Components".	

Tower supply units see Chap. 7 Supplementary Components

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

- 1) For oxygen application, add Order code E10.
- $^{2)}\,$  Not in conjunction with max. span 600 mbar (240.9 inH $_2{\rm O})$
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453.-.Y..-... and 7MF4900-1....-.B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil
- 7) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 8) Without cable gland, with blanking plug
- 9) With enclosed cable gland Ex ia and blanking plug
- $^{10)}\mbox{Configurations}$  with HAN and M12 connectors are only available in Ex ic.
- <sup>11)</sup>Only in connection with IP66.
- <sup>12)</sup>Only in connection with Ex approval A, B or E.
- $^{\rm 13)} \mbox{Permissible}$  only for crimp-contact of conductor cross-section 1  $\mbox{mm}^2$
- $^{14)}\mbox{Only}$  in connection with Ex approval A, B, E or F.
- <sup>15)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

Selection and Orderin	g data	Α	rtic	le	Nc	).	
Pressure transmitters and flow, PN 420 (MAV	for differential pressure VP 6092 psi)						
SITRANS P DS III with P	ROFIBUS PA (PA)	7	M F	4	5 3	3 4	-
SITRANS P DS III with F	OUNDATION Fieldbus (FF)	7	M F	4	5 3	5 5	
✓ Click on the Article New ration in the PIA Life	No. for the online configu- Cycle Portal.		1		1		T
Measuring cell filling	Measuring cell cleaning						ı
Silicone oil	normal	1					
Inert liquid <sup>1)</sup>	grease-free to cleanliness level 2	3					
Nominal measuring ra	nge						
250 mbar	(100.4 inH <sub>2</sub> O)		D				
600 mbar	(240.9 inH <sub>2</sub> O)		E				
1600 mbar 5 bar	(642.4 inH <sub>2</sub> O) (2008 inH <sub>2</sub> O)		F G				
30 bar	(435 psi)		Н				
Wetted parts materials		-					
(stainless steel process							
Seal diaphragm	Parts of measuring cell						
Stainless steel	Stainless steel		A	١.			
Hastelloy	Stainless steel		E	3			
Gold <sup>2)</sup>	Gold		L	.			
Version for diaphragm s	seal <sup>3) 4) 5) 6)</sup>		Υ				
Process connection							
	T with flange connection						
Sealing screw opposit				,			
<ul> <li>Mounting thread 1/16</li> <li>Mounting thread M1</li> </ul>	3-20 UNF to IEC 61518			3			
(only for replacement	nt requirement)			ľ			
<ul> <li>Venting on side of pro</li> </ul>	cess flanges, location of ocess flanges (see dimen-						
	<sub>3</sub> -20 UNF to IEC 61518			7			
<ul> <li>Mounting thread M1 (only for replacement</li> </ul>	2 to DIN 19213			5			
Non-wetted parts mate	· · · · · · · · · · · · · · · · · · ·	-					
Process flange screws							
Stainless steel	Die-cast aluminum				2		
Stainless steel	Stainless steel precision casting				3		
Version							
<ul> <li>Standard version, Ger setting for pressure ur</li> </ul>	nit: bar					1	
<ul> <li>International version, setting for pressure ur</li> </ul>	English plate inscription,					2	
<ul> <li>Chinese version, Englishetting for pressure unit</li> </ul>	sh plate inscription,					3	
All versions include DVD SITRANS P in German, E							

Selection and Ordering data	Article No.		
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)			
SITRANS P DS III with PROFIBUS PA (PA)	7MF4534-		
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7MF4535-		
	H-H-H-H-)	F	
Explosion protection			
• None	Α		
With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"	В		
<ul> <li>"Explosion-proof (Ex d)"<sup>7)</sup></li> <li>"Intrinsic safety and flameproof enclosure"</li> </ul>	D P		
(Ex ia + Ex d) <sup>(8)</sup>	r e		
- "Ex nA/ic (Zone 2)" <sup>9)</sup>	E		
- "Intrinsic safety, explosion-proof enclosure and	R		
dust explosion protection (Ex ia + Ex d + Zone 1D/2D)*8)*10)* (not for DS III FF)			
• FM + CSA intrinsic safe (is)	F		
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) <sup>10)</sup>	s		
• With FM + CSA, Type of protection:			
<ul> <li>"Intrinsic safety and explosion-proof (is + xp)"<sup>7</sup>), max PN 360</li> </ul>	N (	C	
(is + xp)"/), max PN 360			
Electrical connection/cable entry			
Screwed gland M20 x 1.5		В	
<ul> <li>Screwed gland ½-14 NPT</li> <li>M12 connectors (stainless steel) <sup>11)</sup> <sup>12)</sup></li> </ul>		C F	
Display  * Without (display hidden)		_	
<ul><li>Without (display hidden)</li><li>Without visible display</li></ul>		0	
(display concealed, setting: bar)		ľ	
With visible display (setting: bar)		6	
<ul> <li>With customer-specific display (setting as</li> </ul>		7	
specified, Order code "Y21" required)			

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) For oxygen application, add Order code E10.
- $^{2)}$  Not in conjunction with max. span 600 mbar (240.9 inH $_2$ O)
- 3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.
- 4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453.-.Y..... and 7MF4900-1....-B
- 6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 7) Without cable gland, with blanking plug.
- 8) With enclosed cable gland Ex ia and blanking plug.
- <sup>9)</sup> Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- <sup>11)</sup>Only in connection with Ex approval A, B, E or F.
- 12)M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
Stainless steel	A02	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton)) • PTFE (Teflon)	A20	<b>√</b>	<b>√</b>	<b>√</b>
• FEP (with silicone core, approved for food)	A21	✓	✓	✓
<ul> <li>FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F)</li> <li>NBR (Buna N)</li> </ul>	A22 A23	✓	1	1
	AZS	•	•	•
● Han 7D (metal)	A30	1		
Han 8D (instead of Han 7D)	A31	1		
• Angled	A32	✓		
Han 8D (metal)	A33	✓		
Sealing screws (2 units)	A40	1	1	1
1/4-18 NPT, with valve in mat. of process flanges				
Cable sockets for M12 connection (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)		_		
• English	B11	<b>√</b>	1	<b>√</b>
• French	B12 B13	<b>✓</b>	<b>√</b>	<b>√</b>
<ul><li>Spanish</li><li>Italian</li></ul>	B14	<b>V</b>	<b>∀</b>	<b>*</b>
Cyrillic (russian)	B16	1	1	1
English rating plate	B21	1	1	1
Pressure units in inH <sub>2</sub> O and/or psi	D2.	·	•	·
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	<b>√</b>	<b>✓</b>	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate	C14	✓	✓	✓
Acc. to EN 10204-2.2  Functional safety (SIL2)  Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 <sup>1)</sup>		✓	
<b>Functional safety (SIL2/3)</b> Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
Device passport Russia	C99	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	D05	1		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓	✓
<b>Degree of protection IP66/IP68</b> (only for M20 x 1.5 and ½-14 NPT)	D12	1	✓	1
Nom. press. rating PN 500 (MAWP 7250 psi) (Only for measuring cell 600 mbar 30 bar $(240 \text{ inH}_2\text{O} \dots 435 \text{ psi})$ , SIL- and Ex-options not possible)) <sup>2)</sup>	D56	<b>✓</b>		
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	1	✓	1

SITRANS P DS III for differentia	pres	ssure	and	flow
Selection and Ordering data		code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Use in or on zone 1D/2D	E01	1	1	✓
(only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia) "and IP66)				
Export approval Korea	E11	1	1	1
Dual seal	E24	1	1	1
Explosion-proof "Intrinsic safety" (Ex ia) to	E25 <sup>3)</sup>	1	1	1
INMETRO (Brazil)				
(only for transmitter 7MF4B)  "Flameproof" explosion protection accord-	E26 <sup>3)</sup>	1	1	1
ing to INMETRO (Brazil) (only for transmitter 7MF4D)	E20 /	·	•	•
Explosion-proof "Intrinsic safety" (Ex ia + Ex	F28 <sup>3</sup> )	1	1	
d) to INMETRO (Brazil) (only for transmitter 7MF4P)	L20 '			
Ex Approval IEC Ex (Ex ia)	E45 <sup>3)</sup>	1	✓	✓
(only for transmitter 7MF4				
Ex Approval IEC Ex (Ex d)	E46 <sup>3)</sup>	✓	✓	✓
(only for transmitter 7MF4D)  Explosion-proof "Intrinsic safety"	E55 <sup>3)</sup>	1	1	1
to NEPSI (China) (only for transmitter 7MF4B)				
Ex prot. "Explosion-proof" to NEPSI (China)	E56 <sup>3)</sup>	1	1	✓
(only for transmitter 7MF4D)				
<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4E)	E57 <sup>3)</sup>	✓	✓	✓
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>3)</sup>	✓	✓	✓
(only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)	E70 <sup>3)</sup>	✓	✓	✓
(only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia acc. to EAC Ex (Russia)	E80 <sup>4)</sup>		✓	✓
Ex-protection Ex d acc. to EAC Ex (Russia)	E81 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>4)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Interchanging of process connection side	H01	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines	H03	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	1	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>5)</sup>	J08	1	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>5)</sup>	J09	✓	✓	✓
4)				

Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
 Tested according to IEC 61010. Only for measuring materials of the group of fluids 2 in accordance with PED permissible. Not for use with dangerous media suitable.

<sup>3)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

4) Approval pending.

<sup>5)</sup> Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Transmitters for applications with advanced requirements (Advanced)

### **SITRANS P DS III for differential pressure and flow**

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text:				
• in the case of linear characteristic curve (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	✓	<b>√</b> 1)	
• in the case of square rooted characteristic (max. 5 characters): Y02: up to mbar, bar, kPa, MPa, psi	Y02	✓		
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)	Y16	✓	✓	✓
Max. 27 char., specify in plain text: Y16:				
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
Tote:  Tote following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O <sup>*</sup> ), inH <sub>2</sub> O <sup>*</sup> ), ftH <sub>2</sub> O <sup>*</sup> ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or %  *) ref. temperature 20 °C				
Setting of pressure indication in	Y22 +	✓		
non-pressure units <sup>2</sup> ) Specify in plain text: Y22: up to //min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y01 or Y02			
Preset bus address	Y25		✓	1
possible between 1 and 126 Specify in plain text: Y25:				
Damping adjustment in seconds (0 100 s)	Y30	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

✓ = available

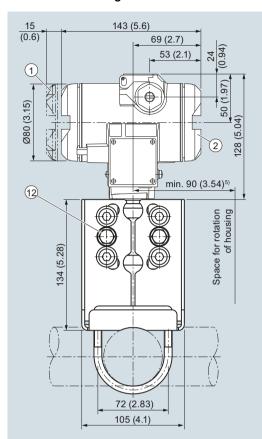
<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

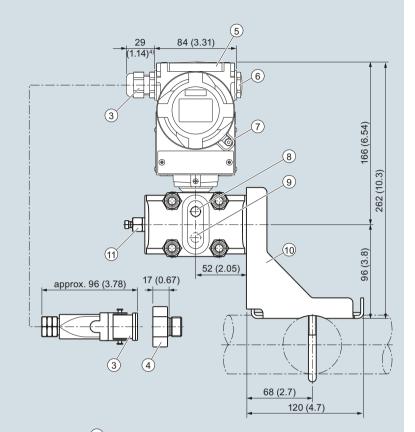
Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow

### Dimensional drawings



- 1 Electronic side, digital display (longer overall length for cover with window)<sup>1)</sup>
- 2 Terminal side<sup>1)</sup>
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)<sup>2) 3)</sup>, Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2) 3)</sup> plug
- 4 Harting adapter
- 5 Protective cover over keys
- Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
   Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- 4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- 5) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

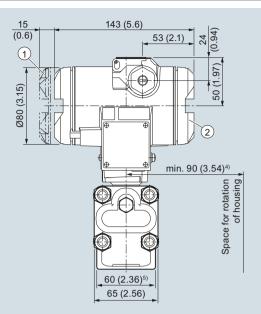


- 6 Blanking plug
- 7 Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Lateral venting for liquid measurement (Standard)
- 9 Lateral venting for gas measurement (suffix H02)
- 10 Mounting bracket (option)
- 11 Sealing screw with valve (option)
- 12 Process connection: 1/4-18 NPT (IEC 61518)

SITRANS P DS III pressure transmitters for differential pressure and flow, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for differential pressure and flow



- approx. 96 (3.78)

  17 (0.67)

  29 (1.14)<sup>8)</sup>

  84 (3.31)

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- Electronic side, digital display
   (longer overall length for cover with window)¹¹)
- 2 Terminal side1)
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)<sup>2) 3)</sup>, Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2) 3)</sup> plug
- 4 Harting adapter
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- 2) Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- <sup>4)</sup> 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
- 5) 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 6) 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 7) 219 mm (8.62 inch) for PN  $\geq$  420 (MAWP  $\geq$  6092 psi)
- 8) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Sealing screw with valve (option)
- 9 Process connection: 1/4-18 NPT (IEC 61518)

SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for level

# Technical specifications

SITRANS P DS III for level				
Input				
Measured variable	Level			
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	
	25 250 mbar 2.5 25 kPa 10 100 inH <sub>2</sub> O	250 mbar 25 kPa 100 inH <sub>2</sub> O	See "Mounting flange"	
	25 600 mbar 2.560 kPa 10 240 inH <sub>2</sub> O	600 mbar 60 kPa 240 inH <sub>2</sub> O		
	53 1600 mbar 5.3160 kPa 21 640 inH <sub>2</sub> O	1600 mbar 160 kPa 642 inH <sub>2</sub> O		
	160 5000 mbar 16500 kPa 2.32 72.5 psi	5000 mbar 500 kPa 72.5 psi		
Lower measuring limit		1	'	
Measuring cell with silicone oil filling	-100 % of max. span or 30 mbar a/3 kPa a/0.44 psia depending on mounting flange			
Measuring cell with inert filling liquid	-100 % of max. span or 30 mbar a/3 kPa a/0.44 psia depending on mounting flange			
Upper measuring limit	100 % of max. span			
Start of scale value	Between the measuring limits (fully adjustable)			
Output	HART		PROFIBUS PA/FOUNDATION Fieldbus	
Output signal	4 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory pre	eset to 3.84 mA	-	
Upper limit (infinitely adjustable)	23 mA, factory presoptionally set to 22.		-	
Load				
Without HART	$R_{\rm B} \leq (U_{\rm H} - 10.5 \text{ V})/0.023 \text{ A in } \Omega,$ $U_{\rm H}$ : Power supply in V		-	
• With HART	$R_{\rm B}$ = 230 500 $\Omega$ (SIMATIC PDM) or $R_{\rm B}$ = 230 1100 $\Omega$ (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal.  Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s)			

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for level

SITRANS P DS III for level				
SITRANS P DS III for level				
Measuring accuracy	Acc. to IEC 60770-	1		
Reference conditions	<ul> <li>Increasing characteristic</li> <li>Start-of-scale value 0 bar/kPa/psi</li> <li>Stainless steel seal diaphragm</li> <li>Silicone oil filling</li> <li>Room temperature 25 °C (77 °F)</li> </ul>			
Measuring span ratio r (spread, Turn-Down)	r = max. measuring	g span/set measuring span or nom. pressure range		
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic				
- 250 mbar/25 kPa/3.6 psi	r≤5: 5 < r≤10:	≤ 0.125 % ≤ (0.007 · r + 0.09) %		
- 600 mbar/60 kPa/8.7 psi	r≤5: 5 <r≤25:< td=""><td>≤ 0.125 % ≤ (0.007 · r + 0.09) %</td></r≤25:<>	≤ 0.125 % ≤ (0.007 · r + 0.09) %		
- 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi	r≤5: 5 <r≤30:< td=""><td>≤ 0.125 % ≤ (0.007 · r + 0.09) %</td></r≤30:<>	≤ 0.125 % ≤ (0.007 · r + 0.09) %		
Influence of ambient temperature (in percent per 28 °C (50 °F))				
• 250 mbar/25 kPa/3.6 psi	$\leq$ (0.4 · r + 0.16) %			
• 600 mbar/60 kPa/8.7 psi	$\leq$ (0.24 · r + 0.16) %	6		
• 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi	≤ (0.2 · r + 0.16) %			
Influence of static pressure				
• on the zero point				
- 250 mbar/25 kPa/3.6 psi	$\leq$ (0.3 · r) % per nominal pressure			
- 600 mbar/60 kPa/8.7 psi	$\leq$ (0.15 · r) % per nominal pressure			
- 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi	≤ (0.1 · r) % per nominal pressure			
• on the span	$\leq$ (0.1 · r) % per nominal pressure			
Long-term stability (temperature change $\pm$ 30 °C ( $\pm$ 54 °F))	$\leq$ (0.25 · r)% in 5 years static pressure max. 70 bar/7 MPa/1015 psi			
Effect of mounting position	Depending on filling	g liquid of mounting flange		
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V			
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 ⋅ 10 <sup>-5</sup> of nominal measuring range			
Rated conditions				
Degree of protection to IEC 60529	IP66 (optional IP66,	/IP68), NEMA 4X		
Temperature of medium	ture to max. permis	into account assignment of max. permissible operating temperasible operating pressure of the respective flange connection!		
Measuring cell with silicone oil filling	-40 +100 <sup>1)</sup> °C (-4			
- High-pressure side	$p_{abs} < 1 \text{ bar: -40} \dots$	+175 °C (-40 +347 °F) +80 °C (-40 +176 °F)		
- Low-pressure side	-40 +100 °C (-40 -20 +60 °C (-4	+212 °F) +140 °F) in conjunction with dust explosion protection		
Ambient conditions				
Ambient temperature				
<ul> <li>Transmitter (with 4-wire connection, observe temperature values of sup- plementary 4-wire electronics)</li> </ul>	-40 +85 °C (-40 .	+185 °F)		
Display readable	-30 +85 °C (-22 .	+185 °F)		
Storage temperature	-50 +85 °C (-58 .	+185 °F)		
Climatic class				
- Condensation	Relative humidity 0 ics	100 %, condensation permissible, suitable for use in the trop-		
Electromagnetic Compatibility				
- Emitted interference and interference immunity	Acc. to IEC 61326	and NAMUR NE 21		

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for level

		SITRANS P DS III for level		
SITRANS P DS III for level				
Design				
Weight (without options)				
<ul> <li>To EN (pressure transmitter with mounting flange, without tube)</li> </ul>	≈ 11 13 kg (≈ 24.2 28.7 (lb)			
<ul> <li>To ASME (pressure transmitter with mounting flange, without tube)</li> </ul>	≈ 11 18 kg (≈ 24.2 39.7 lb)			
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408			
Wetted parts materials				
High-pressure side				
Seal diaphragm of mounting flange	• Stainless steel, WNr. 1.4404/316L - coated with PFA - coated with PTFE - coated with ECTFE - gold plated • Monel 400, mat. no. 2.4360 • Hastelloy C276, mat. no 2.4619 • Hastelloy C4, mat. no. 2.4610 • Hastelloy C22, mat. no. 2.4602 • Tantalum • Titanium, mat. no. 3.7035 • Nickel 201 • Duplex 2205, mat. no. 1.4462			
Measuring cell filling	Silicone oil			
Process connection				
High-pressure side	Flange to EN and ASME			
Low-pressure side	Female thread $1/4$ -18 NPT and flange conr DIN 19213 or $7/16$ -20 UNF to EN 61518	nection with mounting thread M10 to		
Power supply $U_{H}$	HART	PROFIBUS PA/FOUNDATION Fieldbus		
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-		
Power supply	Supplied through bus			
Separate 24 V power supply necessary	-	No		
Bus voltage				
• Not Ex	- 9 32 V			
With intrinsically-safe operation	- 9 24 V			
Current consumption				
Basic current (max.)	_	12.5 mA		

• Start-up current ≤ basic current

Fault disconnection electronics (FDE) available

• Max. current in event of fault

Yes 15.5 mA

Yes

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P DS III for level

SITRANS P DS III for level	HADT	PROFIRMS DA / FOUNDATION Fieldhus			
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus			
Classification according to PED 97/23/EC		For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)			
Explosion protection					
Intrinsic safety "i"	PTB 13 ATEX 2007 X	PTB 13 ATEX 2007 X			
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb			
- Permissible ambient temperature	-40 +70 °C (-40 +158 °F) temperate	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +70 °C (-40 +158 °F) temperature class T5; -40 +60 °C (-40 +140 °F) temperature class T6			
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1.2 \text{ W}$			
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4$ mH, $C_{\rm i} = 6$ nF	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$			
• Explosion-proof "d"	PTB 99 ATEX 1160				
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb				
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperati -40 +60 °C (-40 +140 °F) temperati				
- Connection	To circuits with values: $U_{H} = 10.5 \dots 45 \text{ V DC}$	To circuits with values: $U_{\rm H} = 9 \dots 32 \text{ V DC}$			
<ul> <li>Dust explosion protection for zone 20</li> </ul>	PTB 01 ATEX 2055	PTB 01 ATEX 2055			
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db				
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	-40 +85 °C (-40 +185 °F)			
- Max. surface temperature	120 °C (248 °F)				
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 250 \text{ mA}$ , $P_0 = 1.2 \text{ W}$			
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$			
<ul> <li>Dust explosion protection for zone 21/22</li> </ul>	PTB 01 ATEX 2055	<b>'</b>			
- Marking	Ex II 2 D Ex tb IIIC T120°C Db				
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC; $P_{\rm max}$ = 1.2 W	To circuits with values: $U_{\rm H}$ = 9 32 V DC; $P_{\rm max}$ = 1 W			
Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X				
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc				
- Connection (Ex nA)	$U_{\rm m} = 45 \text{ V}$	<i>U</i> <sub>m</sub> = 32 V			
- Connection (Ex ic)	To circuits with values: $U_{\rm i} = 45 \text{ V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V}$ , $I_0 = 570 \text{ mA}$ Linear barrier: $U_0 = 32 \text{ V}$ , $I_0 = 132 \text{ mA}$ , $P_0 = 1 \text{ W}$			
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$			
• Explosion protection acc. to FM	Certificate of Compliance 3008490				
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV T4T6; CL I, DIV 2, GP ABCD T4T6; CL II, DIV	/ 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC			
• Explosion protection to CSA	Certificate of Compliance 1153651	- 2, GI 1 G, OL III			
- Identification (XP/DIP) or (IS)	•	/ 1, GP EFG; CL III; Ex ia IIC T4T6; CL I,			

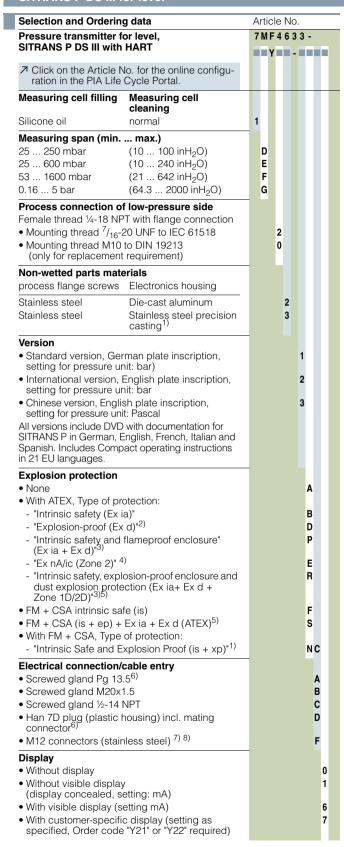
<sup>1)</sup> This value may be increased if the process connection is sufficiently insulated.

Transmitters for applications with advanced requirements (Advanced)

HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	
PROFIBUS PA communication		- Adaptation to customer-specif-	Yes, linearly rising or falling
Simultaneous communication with master class 2 (max.)	4	ic process variables	characteristic
The address can be set using	Configuration tool or local	<ul> <li>Electrical damping, adjustable</li> <li>Simulation function</li> </ul>	0 100 s
	operation (standard setting address 126)		Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or 10 (two measured values)	- Limit monitoring	value) Yes, one upper and lower warn-
Input byte	0, 1, or 2 (register operating mode and reset function for		ing limit and one alarm limit respectively
Internal preprocessing	metering)	<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Standard FOUNDATION Field- bus function block
	3.0, class B	Physical block	1 resource block
Function blocks	2	Transducer blocks	1 transducer block Pressure with
Analog input			calibration, 1 transducer block LCD
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input/Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect	- Simulation function: Measured	Constant value or over parame-
- Limit monitoring	value) Yes, one upper and lower warn-	pressure value, sensor temper- ature and electronics tempera- ture	terizable ramp function
	ing limit and one alarm limit respectively	Mounting flange	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	Nominal diameter • Acc. to EN 1092-1	Nominal pressure
- Failure mode	parameterizable (summation	- DN 80	PN 40
	with last good value, continuous summation, summation with	- DN100	PN16, PN40
	incorrect value)	• To ASME B16.5	
- Limit monitoring	One upper and lower warning	- 3 inch	class 150, class 300
	limit and one alarm limit respec- tively	- 4 inch	class 150, class 300
<ul> <li>Physical block</li> </ul>	1		
Transducer blocks	2		
Pressure transducer block			
<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes		
- Monitoring of sensor limits	Yes		
<ul> <li>Specification of a container characteristic with</li> </ul>	Max. 30 nodes		
<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes		
<ul> <li>Gradual volume suppression and implementation point of square-root extraction</li> </ul>	Parameterizable		
<ul> <li>Simulation function for mea- sured pressure value and sen- sor temperature</li> </ul>	Constant value or over parameterizable ramp function		

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for level



#### Ordering information

1st order item: Pressure transmitter 7MF4633-... 2nd order item: Mounting flange 7MF4912-3...

#### ordering example

Item line 1: 7MF4633-1EY20-1AA1-Z

B line: Y01

C line: Y01: 80 to 143 mbar (1.16 to 2.1 psi)

Item line 2: 7MF4912-3GE01

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- Not in conjunction with electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 2) Without cable gland, with blanking plug.
- 3) With enclosed cable gland Ex ia and blanking plug.
- <sup>4)</sup> Configurations with HAN and M12 connectors are only available in Ex ic.
- 5) Only in connection with IP66.
- 6) Only in connection with Ex approval A, B or E.
- 7) M12 delivered without cable socket
- 8) Only in connection with Ex approval A, B, E or F.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for level

Selection and Ordering	g data	Arti	cle	e N	0.				
Pressure transmitters									
SITRANS P DS III with P	ROFIBUS PA (PA)	7 M	F 4	16	3 4	١ -			
	OUNDATION Fieldbus (FF)	7 M	F4	16	3 5	5 -			
	lo. for the online configu-	1						1	
ration in the PIA Life	Cycle Portal.								
Nominal measuring ra									
250 mbar 600 mbar	(100 inH <sub>2</sub> O)	D E							
1600 mbar	(240 inH <sub>2</sub> O) (642 inH <sub>2</sub> O)	F							
5 bar	(2000 inH <sub>2</sub> O)	G							
Process connection of									
	T with flange connection								
<ul> <li>Mounting thread <sup>7</sup>/<sub>16</sub>-2</li> </ul>			2	2					
<ul> <li>Mounting thread M10 (only for replacement</li> </ul>	to DIN 19213 requirement)		(	)					
Non-wetted parts mate		-							
process flange screws	Electronics housing								
Stainless steel	Die-cast aluminum			2					
Stainless steel	Stainless steel precision casting			3					
Version									
<ul> <li>Standard version, Ger setting for pressure ur</li> </ul>					1				
	English plate inscription,				2	2			
setting for pressure ur	nit: bar								
<ul> <li>Chinese version, English setting for pressure unit</li> </ul>	sh plate inscription, t· Pascal				3	3			
All versions include DVD									
SITRANS P in German, E	nglish, French, Italian and								
Spanish. Includes Comp in 21 EU languages.	act operating instructions								
Explosion protection		=							
• None						Α			
With ATEX, Type of pro									
- "Intrinsic safety (Ex i						В			
<ul><li>- "Explosion-proof (Ex</li><li>- "Intrinsic safety and</li></ul>						D P			
(Ex ia + Ex d) <sup>(2)</sup>	nameproor enclosure					ľ			
- "Ex nA/ic (Zone 2)" 3						Ε			
- "Intrinsic safety, expl	osion-proof enclosure and					R			
Zone 1D/2D) <sup>(2)4)</sup> (no	ction (Ex ia + Ex d + t for DS III FF)								
• FM + CSA intrinsic sat						F			
• FM + CSA (is + ep) +	Ex ia + Ex d (ATEX)4)					S			
<ul> <li>With FM + CSA, Type</li> </ul>									
- "Intrinsic Safe and E	xplosion Proof (is + xp)"1)					N	С		
Electrical connection/	•						D		
<ul> <li>Screwed gland M20 x</li> <li>Screwed gland ½-14 I</li> </ul>							B C		
M12 connectors (stair							F		
Display									
Without display								)	
<ul> <li>Without visible display (display concealed, se</li> </ul>							1		
<ul> <li>With visible display (see</li> </ul>	• ,						6	3	
• With customer-specific	c display (setting as						7	7	
specified, Order code	"Y21" required)								

#### Ordering information

1st order item: Pressure transmitter 7MF4634-... 2nd order item: Mounting flange 7MF4912-...

#### ordering example

Item line 1: 7MF4634-1EY20-1AA1 Item line 2: 7MF4912-3GE01

Included in delivery of the device:
• Brief instructions (Leporello)
• DVD with detailed documentation

- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) Without cable gland, with blanking plug.
- <sup>2)</sup> With enclosed cable gland Ex ia and blanking plug.
- 3) Configurations with HAN and M12 connectors are only available in Ex ic.
- 4) Only in connection with IP66.
- 5) M12 delivered without cable socket
- 6) Only in connection with Ex approval A, B, E or F.

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
O-rings for process flanges on low-pressure side (instead of FPM (Viton))  • PTFE (Teflon)	A20	<b>√</b>	<b>✓</b>	<b>*</b>
FEP (with silicone core, approved for food) FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F)  NRP (Curre N)  NRP (Curre N)	A21 A22	<b>* *</b>	4	4
• NBR (Buna N) Plug	A23	<b>,</b>	•	•
<ul><li>Han 7D (metal)</li><li>Han 8D (instead of Han 7D)</li></ul>	A30 A31	<b>✓</b>		
• Angled	A32	1		
Han 8D (metal)	A33	✓		
Sealing screw 1/4-18 NPT, with valve in mat. of process flanges	A40	<b>√</b>	✓	<b>✓</b>
Cable sockets for M12 connectors (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	1	1	1
• French	B12	✓	✓	✓
• Spanish	B13	✓.	1	✓
• Italian	B14	<b>✓</b>	1	1
Cyrillic (russian)	B16		<b>√</b>	
English rating plate Pressure units in inH <sub>2</sub> 0 and/or psi	B21	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 <sup>1)</sup>		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	<b>✓</b>		
Device passport Russia	C99	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of process flange	D37	<b>✓</b>	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	<b>✓</b>

Selection and Ordering data	Order	code		
Further designs		HART	PA	F
Add "-Z" to Article No. and specify Order code.				
Use on zone 1D / 2D	E01	✓	✓	,
(only together with type of protection				
"Intrinsic safety" (transmitter 7MF4B Ex ia) "and IP66)				
Overfilling safety device for flammable and non-flammable liquids	E08	1		
(max. PN 32 (MAWP 464 psi), basic device				
with type of protection "Intrinsic safety (Ex ia)"				
to WHG and VbF, not together with measuring cell filling "inert liquid")				
Export approval Korea	E11	1	1	,
CRN approval Canada	E22	1	1	
(Canadian Registration Number)				
Dual seal	E24	✓	✓	
Explosion-proof "Intrinsic safety" (Ex ia) to	E25 <sup>2)</sup>	✓	✓	
INMETRO (Brazil)				
(only for transmitter 7MF4B)	<b>-002</b> )		,	
"Flameproof" explosion protection according to INMETRO (Brazil)	- E26-	<b>V</b>	•	
(only for transmitter 7MF4)				
Explosion-proof "Intrinsic safety" (Ex ia +	E28 <sup>2)</sup>	✓	✓	
(only for transmitter 7MF4P)				
Ex Approval IEC Ex (Ex ia)	E45 <sup>2)</sup>	1	1	
(only for transmitter 7MF4B)	E45 /		•	
Ex Approval IEC Ex (Ex d)	E46 <sup>2)</sup>	1	1	
(only for transmitter 7MF4D)	_40			
Explosion-proof "Intrinsic safety"	E55 <sup>2)</sup>	✓	✓	
to NEPSI (China)				
(only for transmitter 7MF4B)	<b>2</b> )	,	,	
Explosion protection "Explosion-proof" to NEPSI (China)	E56 <sup>2)</sup>	<b>V</b>	•	
(only for transmitter 7MF4)				
Ex protection "Zone 2" to NEPSI (China)	E57 <sup>2)</sup>	✓	✓	
(only for transmitter 7MF4E)				
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>2)</sup>	✓	✓	•
(only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof"	E70 <sup>2)</sup>	1	1	,
explosion protection acc. to Kosha (Korea)	•			
(only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>3)</sup>	✓	✓	,
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>3)</sup>	✓	✓	,
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>3)</sup>	✓	✓	•
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>3)</sup>	✓	✓	,
Two coats of lacquer on casing and cover	G10	1	✓	,
(PU on epoxy)				
Replacement of process connection side	H01	1	1	,

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III for level

Selection and Ordering data	Order code						
Further designs		HART	PA	FF			
Add "- $\mathbf{Z}$ " to Article No. and specify Order code.							
Transient protector 6 kV (lightning protection)	J01	✓	✓	1			
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>4)</sup>	J08	✓	✓	✓			
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>4)</sup>	J09	1	✓	✓			

<sup>1)</sup> Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	✓	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)	Y16	✓	✓	✓
Max. 27 characters, specify in plain text: Y16:				
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indicator in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
The following pressure units can be selected: bar, mbar, mm $H_2O^*$ , in $H_2O^*$ , $ftH_2O^*$ ,				
mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % ") ref. temperature 20 °C				
Setting of pressure indicator in non-pressure units <sup>2</sup> ) Specify in plain text: Y22: up to //min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 <sup>3)</sup> + Y01	•		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 100 s)	Y30	✓	1	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>3)</sup> Approval pending.

<sup>✓ =</sup> available

<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices

calculated in the same way as for HART devices.

2) Preset values can only be changed over SIMATIC PDM.

<sup>3)</sup> Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Transmitters for applications with advanced requirements (Advanced)

Selection and Orde	ring data	Article No	o. Order			
Mounting flange	Mounting flange					
Directly mounted on	Directly mounted on the SITRANS P pressure transmitter (converter part) for level, for DS III					
Click on the Artic ration in the PIA L						
Connection to EN 1 Nominal diameter DN 50  DN 80 DN 100  Connection to ASN Nominal diameter 2 inch  3 inch 4 inch	Nominal pressure PN 10/16/25/40 PN 100 PN 10/16/25/40 PN 10/16 PN 25/40	A B D G H L M N P Q R T U				
Nominal diameter:  Wetted parts mater  Stainless steel 316  Coated with PFA  Coated with ECT  Monel 400, mat. nd  Hastelloy C276, m  Hastelloy C4, mat.  Hastelloy C22, mat.  Tantalum	ials ibl  E FE <sup>1)</sup> b. 2.4360 at. no. 2.4819 no. 2.4610 t. no. 2.4602 3.7035 (max. 150 °C (302 °F))	Z  A D E O F G J V O K L O M O	J1Y			
Duplex 2205, mat.     Duplex 2205, mat.     Stainless steel 316 thickness approx.      Tube length     without tube Other version: add 0	no. 1.4462 no. 1.4462, incl. main body SL. gold plated.	Q R S 0 -	K1Y			

Selection and Ordering data	Article	No.		rder ode	
Mounting flange	7 M F	491	2		
Directly mounted on the SITRAI transmitter (converter part) for I series	3	1	Ī	i	
Customer-specific tubus leng Specify customer-specific length					
Order Code					
• Wetted parts materials: Stainle: Range	ss steel without foil Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	Α			
51 100 mm (2.01 3.94")	100 mm (3.94")	A			
101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	150 mm (5.91") 200 mm (7.87")	A			
201 250 mm (7.91 9.84")	250 mm (9.84")	A			
<ul> <li>Wetted parts materials: Stainle with ECTFE</li> </ul>	ss steel coated				
Range	Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	F			
51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	100 mm (3.94") 150 mm (5.91")	F			
151 200 mm (5.94 7.87")	200 mm (7.87")	F			
201 250 mm (7.91 9.84")	250 mm (9.84")	F	-		
<ul> <li>Wetted parts materials: Stainles PFA</li> </ul>	ss steel coated with				
Range	Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	D			
51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	100 mm (3.94") 150 mm (5.91")	D D			
151 200 mm (5.94 7.87")	200 mm (7.87")	D			
201 250 mm (7.91 9.84")	250 mm (9.84")	D	5		
<ul> <li>Wetted parts materials: Monel Range</li> </ul>	400 Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	G	1		
51 100 mm (2.01 3.94")	100 mm (3.94")	G	2		
101 150 mm (3.98 5.91")	150 mm (5.91")	G			
151 200 mm (5.94 7.87")	200 mm (7.87")	G	4		
<ul> <li>Wetted parts materials: Hastell Range</li> </ul>	Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	J			
51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	100 mm (3.94") 150 mm (5.91")	J			
151 200 mm (5.94 7.87")	200 mm (7.87")	J			
<ul> <li>Wetted parts materials: Tantalu Range</li> </ul>	um   Standard length				
20 50 mm (0.79 1.97")	50 mm (1.97")	K	1		
51 100 mm (2.01 3.94")	100 mm (3.94")	K			
101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	150 mm (5.91") 200 mm (7.87")	K K			
Filling liquid	1.22()				
• Silicone oil M5			1		
• Silicone oil M50			2		
High-temperature oil     Halocarbon oil (for O. moasu)	romont)		3 4		
<ul> <li>Halocarbon oil (for O<sub>2</sub>-measu</li> <li>Food oil (FDA-listed)</li> </ul>	rement)		7		
Other version, add			9	М	1 Y
Order code and plain text: filling liquid:					
4/					

<sup>1)</sup> For vacuum on request

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Customer-specific tubus length Select range, enter desired length in plain text (No entry = standard length)	Y44	✓	✓	✓
Spark arrester For mounting on zone 0 (incl. documentation)	A01	✓	✓	✓
Remote seal nameplate attached out of stainless steel, contains Article No. and order number of the remote seal supplier	B20	✓	<b>*</b>	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	C10	<b>√</b>	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
2.2 Certificate of FDA approval of fill oil Only in conjunction with filling liquid "Food oil" (FDA listed)"	C17	✓	✓	1
"Functional safety (SIL2)" certificate to IEC 61508	C20	✓	✓	
(only for conjunction with the Order code "C20" in the case of SITRANS P DS III transmitter)				
"Functional safety (SIL2/3)" certificate to IEC 61508 (only for conjunction with the Order code "C23" in the case of SITRANS P DS III transmitter)	C23	<b>✓</b>	✓	
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	D07	✓	<b>✓</b>	✓
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stain- less steel 1.4404/316L and Hastelloy C276)	D08	✓	✓	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	E10	<b>✓</b>	✓	✓
Epoxy painting Not possible with negative pressure service	E15	✓	✓	✓
Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.				
<u> </u>				

Selection and Ordering data	Order			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Flanges according to EN 1092-1, sealing surface B1 (stainless steel 316L) (only in combination with "Z" at data position 9)				
DN 25, PN 10/16/25/40	J0A	✓	✓	✓
DN 25, PN 63/100/160	J0B	<b>V</b>	1	<b>V</b>
DN 40, PN 10/16/25/40 DN 40, PN 63/100	J0C J0D	1	1	1
DN 40, PN 160	J0E	1	1	1
Sealing surface smooth, form B2 or RFSF (Stainless steel diaphragm) previously DIN 2501, form E	J11	✓	✓	✓
Sealing surface groove, EN 1092-1, form D	J14	1	1	1
instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	314	•	•	•
Sealing surface with spring according to EN 1092-1, form F, (previously DIN 2512, form F) in stainless steel 316L				
DN 25 DN 40	J30 J31	1	1	1
DN 50	J31 J32	<b>√</b>	<b>√</b>	<b>✓</b>
DN 80	J33	1	1	1
DN 100	J34	✓	✓	✓
DN 125	J35	✓	✓	✓
Sealing surface with male face according to EN 1092-1, form E (previously DIN 2512, form V13) in stainless steel 316L				
DN 25	J40	<b>√</b>	1	<b>V</b>
DN 40 DN 50	J41 J42	<b>√</b>	1	1
DN 80	J42 J43	<b>V</b>	<b>∨</b>	<b>∀</b>
DN 100	J44	1	1	1
DN 125	J45	✓	✓	✓
Sealing surface with female face according to EN 1092-1, form F (previously DIN 2512, form R13) in stainless steel 316L				
DN 25	J50	✓.	✓	✓
DN 40	J51	<b>1</b>	1	1
DN 50 DN 80	J52 J53	1	<b>✓</b>	1
DN 100	J54	1	1	✓
DN 125	J55	✓	✓	✓
Flange according to ASME B16.5 RF 125 250 AA, in stainless steel 316L (only in combination with "Z" at data position 9)				
1", class 150	J6A	1	✓	✓
1", class 300	J6B	✓.	✓	✓.
1", class 400/600	J6C	1	1	1
1", class 900/1500 1½", class 150	J6D J6E	<b>√</b>	1	<b>√</b>
1½", class 300	J6F	1	<b>√</b>	<b>✓</b>
1½", class 400/600	J6G	✓	✓	✓
1½", class 900/1500	J6H	✓	✓	✓
Sealing surface B1 or ASME B16.5 RF 125 250 AA instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276 (2.4819), tantalum and Duplex 2205 (1.4462)	J12	<b>√</b>	<b>✓</b>	<b>√</b>
and for nominal sizes 2", 3", DN 50 and DN 80)				
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 250 AA (only for wetted parts made of stainless steel 316L)	J24	1	1	<b>√</b>

Transmitters for applications with advanced requirements (Advanced)

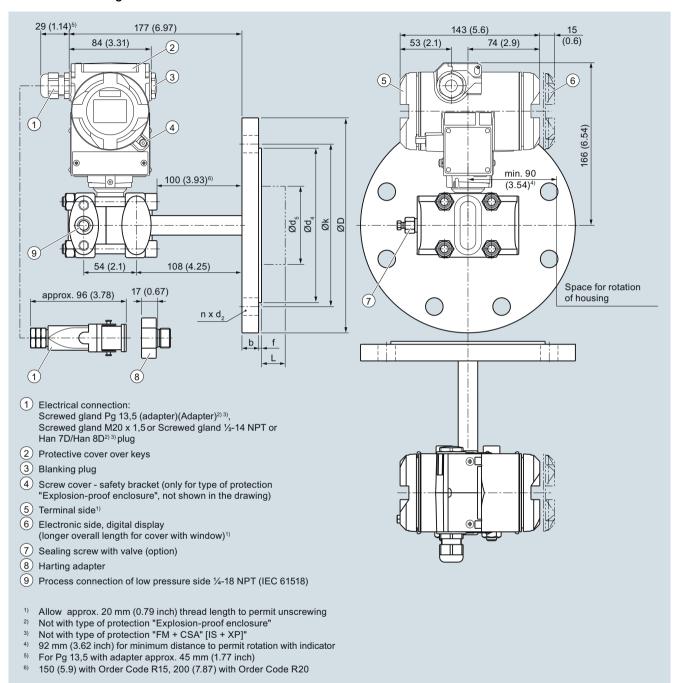
Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code				
Flange acc. to JIS, in stainless steel 316L (only in combination with "Z" at data position 9)				
JIS DN 50, 10 K 316L	J7A	✓	✓	✓
JIS DN 50, 20 K 316L	J7B	✓	<b>∀ ∀ ∀</b>	✓
JIS DN 80, 10 K 316L	J7C	✓	✓	✓
JIS DN 80, 20 K 316L	J7D	✓	✓	✓
Elongated pipe, 150 mm instead of 100 mm,	R15	✓	✓	✓
max. medium temperature 250 $^{\circ}$ C, observe the maximum permissible media temperature of the filling liquid.				
Elongated pipe, 200 mm instead of 100 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R20	✓	✓	✓
Negative pressure service				
for use in the low-pressure measuring range for transmitter for level	V04	✓	✓	✓
Note: suffix "Y01" required with pressure transmitter				
Extended negative pressure service				
for use in the low-pressure measuring range for transmitter for level	V54	✓	✓	✓
Note: suffix "Y01" required with pressure transmitter				
/				

<sup>✓ =</sup> available

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III for level

# Dimensional drawings



SITRANS P DS III with HART pressure transmitters for level, including mounting flange, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III for level

#### Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>M</sub>	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 50	PN 10/16/ 25/40	20	165	90	18	102	48.3	45 <sup>1)</sup>	2	125	8	0, 50, 100, 150 or 200
	PN 100	28	195	90	26	102	48.3	45 <sup>1)</sup>	2	145	8	
DN 80	PN 10/16/ 25/40	24	200	90	18	138	76	72 <sup>2)</sup>	2	160	8	
	PN 100	32	230	90	26	138	76	72 <sup>2)</sup>	2	180	8	
DN 100	PN 10/16	20	220	115	18	158	94	89	2	180	8	
	PN 25/40	24	235	115	22	162	94	89	2	190	8	

#### Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>M</sub>	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
2 inch	150	0.77 (19.5)	5.91 (150)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 <sup>1)</sup> (45)	0.08 (2)	4.74 (120.5)	4	0, 2, 3.94,
	300	0.89 (22.7)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 <sup>1)</sup> (45)	0.08 (2)	5 (127)	8	5.94 or 7.87 (0, 50, 100,
	400/600	1.28 (32.4)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 <sup>1)</sup> (45)	0.28 (7)	5 (127)	8	150 or 200)
	900/1500	1.78 (45.1)	8.46 (215)	1.02 (26)	5 (127)	1.9 (48.3)	1.77 <sup>1)</sup> (45)	0.28 (7)	6.5 (165)	8	
3 inch	150	0.96 (24.3)	7.48 (190)	0.79 (20)	5 (127)	3 (76)	2.83 <sup>2)</sup> (72)	0.08 (2)	6 (152.5)	4	
	300	1.14 (29)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83 <sup>2)</sup> (72)	0.08 (2)	6.63 (168.5)	8	
	600	1.53 (38.8)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83 <sup>2)</sup> (72)	0.28 (7)	6.63 (168.5)	8	
4 inch	150	0.96 (24.3)	9.06 (230)	0.79 (20)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.5 (190.5)	8	
	300	1.27 (32.2)	10.04 (255)	0.87 (22)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.87 (200)	8	
	400	1.65 (42)	10.04 (255)	1.02 (26)	6.22 (158)	3.69 (94)	3.5 (89)	0.28 (7)	7.87 (200)	8	

d: Internal diameter of gasket to DIN 2690

d<sub>M</sub>: Effective diaphragm diameter

 $<sup>^{1)}</sup>$  59 mm = 2.32 inch with tube length L=0.

 $<sup>^{2)}</sup>$  89 mm =  $3\frac{1}{2}$  inch with tube length L=0.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III Supplementary electronics for 4-wire connection

#### Overview



Direct connection of the supplementary electronics to a SITRANS P DS III pressure transmitter with HART produces a transmitter for 4-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

#### Note on ordering:

The supplementary electronics can only be ordered as an **optional accessory** for the corresponding pressure transmitter.

#### Technical specifications

Output	
·	
Output signal	0 20 mA or 4 20 mA
Load	Max. 750 Ω
Voltage measurement	Linear (square-rooting in transmitter if necessary)
Electrical isolation	Between power supply and input/ output
Measuring accuracy	acc. to IEC 60770-1
Measurement deviation (in addition to transmitter)	≤ 0.15 % of set span
Influence of ambient temperature	≤ 0.1 % per 10 K
Power supply effect	≤ 0.1 % per 10 % change in voltage or frequency
Load effect	≤ 0.1 % per 100 % change
Rated conditions	
Ambient temperature	
• 24 V version	-20 +80 °C (-4 +176 °F)
• 230 V version	-20 +60 °C (-4 +140 °F)
Storage temperature	-50 +85 °C (-58 +185 °F)
Degree of protection	IP54 to IEC 60529
Electromagnetic compatibility (EMC)	IEC 61236
Condensation	Relative humidity 0 95 % condensation permissible

#### Structural design

Dimensions (W  $\times$  H  $\times$  D) in mm

(inch)

Electrical connection

80 x 120 x 60 (3.15 x 4.72 x 2.36)

Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug

#### Power supply

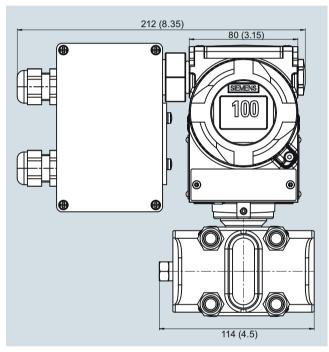
Supply voltage

230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA)

Permissible ripple (within the specified limits)

Approx. 2.5 V pp

#### Dimensional drawings

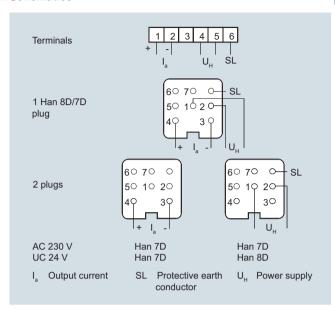


SITRANS P pressure transmitters with supplementary electronics for four-wire connection, dimension drawing, dimensions in mm

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III Supplementary electronics for 4-wire connection

#### Schematics



Supplementary electronics for 4-wire connection, connection diagram

Selection and	Order code			
Supplementary connection Article No. of the 7MF4.33A	V			
Power supply 24 V AC/DC Terminals; 2 Pg screwed glands, to left 2 Han 7D/Han 8D plugs incl. mating connector, to left 1 Han 7D plug incl. mating connector, angled Terminals; 1 Pg screwed gland, downwards 1 Han 8D plug incl. mating		1 3 5 6		
230 V AC	connector, downwards (observe arrangement of plug and differential pressure line) Terminals; 2 Pg screwed glands, to left 2 Han 7D plugs incl. mating connector, to left	7 8		
Output current 0 20 mA 4 20 mA			0	
Accessories		Art	icl	le No.
Instruction Ma German/English		<b>A</b> 5	ΕO	00322799

Transmitters for applications with advanced requirements (Advanced)

	suring cell for pressure	7 11 616	Article No. <b>7MF4990</b> -	
for SITRANS P DS	IOI SITRANS P DS III			0 - 0 D B (
Click on the Artition in the PIA L	cle No. for the online configura- fe Cycle Portal.			
•	ing Measuring cell cleaning			
Silicone oil	Normal	1		
Inert liquid	grease-free to cleanliness level 2	3		
Measured span (n	nin max.)			
0.01 1 bar	(0.15 14.5 psi)	В		
0.04 4 bar	(0.6 58 psi)	С		
0.16 16 bar	(2.32 232 psi)	D		
0.63 63 bar	(9.14 914 psi)	E		
1.6 160 bar	(23.2 2320 psi)	F		
4.0 400 bar	(58.0 5802 psi)	G		
7.0 700 bar	(102.0 10153 psi)	J		
Wetted parts mate	erials			
Seal diaphragm	Process connection			
Stainless steel	Stainless steel	,	A	
Hastelloy	Stainless steel		В	
Hastelloy	Hastelloy	(	С	
Process connection	on			
<ul> <li>Connection shan</li> </ul>			0	
<ul> <li>Female thread ½-</li> </ul>			1	
Oval flange made				
max. span 160 ba	ar (2320 psi) d <sup>7</sup> / <sub>16</sub> -20 UNF to IEC 61518		2	
	d M10 to DIN 19213		3	
Further designs		Ord	er (	code
Please add "-Z" to a Order code.	Article No. and specify			
Inspection certific	-1-	C12		

Selection and Orde	ring data	Articl	e No.	
Replacement meas pressure for SITRA pressure series)		7MF4992-		
	le No. for the online configura- e Cycle Portal.			
	ng Measuring cell cleaning			
Silicone oil	Normal	1		
Inert liquid	grease-free to cleanliness level 2	3		
Measured span (mi	n max.)			
8.3 250 mbar a	(0.12 3.62 psia)	D		
43 1300 mbar a	(0.62 18.85 psia)	F		
0.16 5 bar a	(2.32 72.5 psia)	G		
1 30 bar a	(14.5 435 psia)	Н		
Wetted parts mater	ials			
Seal diaphragm	Process connection			
Stainless steel	Stainless steel	A		
Hastelloy	Stainless steel	В		
Hastelloy	Hastelloy	С		
Process connection	n			
<ul> <li>Connection shank</li> </ul>	G1/2B to EN 837-1		0	
• Female thread 1/2-1	4 NPT		1	
Oval flange made				
max. span 160 bar				
<ul> <li>Mounting thread</li> <li>Mounting thread</li> </ul>	<sup>7</sup> / <sub>16</sub> -20 UNF to IEC 61518		3	
Further designs	WITO TO BIT TO LIO		r code	
Please add "-Z" to Al Order code.	rticle No. and specify			
Inspection certificate to EN 10204-3.1	te	C12		

# **Pressure Measurement**

Transmitters for applications with advanced requirements (Advanced)

Selection and Orderi	ing data	Article No.	Selection and Ordering data	Article No.
Replacement measu	ring cell for absolute pres-	7MF4993-	Replacement measuring cell for differential	7MF4994-
SITRÀNS P DS III with	ential pressure series) for HART, DS III with PROFIBUS UNDATION Fieldbus series	- 0 D C 0	pressure and PN 32/160 (MAWP 464/2320 psi) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series	- 0 D C 0
Click on the Article tion in the PIA Life	No. for the online configura- Cycle Portal.		Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
	Measuring cell cleaning		Measuring cell filling Measuring cell cleaning	
Silicone oil Inert liquid	Normal grease-free to cleanliness level 2	3	Silicone oil Normal Inert liquid grease-free to cleanliness level 2	3
Measured span (min	-		Measured span (min max.) PN 32 (MAWP 464 psi)	
8.3 250 mbar a 43 1300 mbar a	(0.12 3.62 psia) (0.62 18.85 psia)	D F	1 20 mbar <sup>1)</sup> (0.4 8 inH <sub>2</sub> O)	В
0.16 5 bar a	(2.32 72.5 psia)	G	PN 160 (MAWP 2320 psi)	
1 30 bar a	(14.5 435 psia)	H	1 60 mbar (0.4 24 inH <sub>2</sub> O)	С
5.3 100 bar a	(76.9 1450 psia)	KE	2.5 250 mbar (1 100 inH <sub>2</sub> O)	D
Wetted parts material Seal diaphragm	als Parts of measuring cell		6 600 mbar (2.4 240 inH <sub>2</sub> O) 16 1600 mbar (6.4 642 inH <sub>2</sub> O) 50 5000 mbar (20 2000 inH <sub>2</sub> O)	E F G
Stainless steel	Stainless steel	A	0.3 30 bar (4.35 435 psi)	H
Hastelloy	Stainless steel	В	Wetted parts materials	
Hastelloy Tantalum	Hastelloy Tantalum	C E	(stainless steel process flanges)	
Monel	Monel	H	Seal diaphragm Parts of measuring cell	
Gold	Gold	L	Stainless steel Stainless steel	A
Process connection			Hastelloy Stainless steel Hastelloy Hastelloy	B C
	NPT with flange connection		Tantalum <sup>2)</sup> Tantalum	E
•	site process connection		Monel <sup>2)</sup> Monel Gold <sup>2)</sup> Gold	H
<ul> <li>Mounting thread N</li> <li>Mounting thread N</li> </ul>	/ <sub>10</sub> -20 UNF to IEC 61518	0 2	Process connection	
Vent on side of proc			Female thread 1/4-18 NPT with flange connection	
- Mounting thread M	110 to DIN 19213	4	Sealing screw opposite process connection	
<ul> <li>Mounting thread <sup>7</sup></li> </ul>	/ <sub>16</sub> -20 UNF to IEC 61518	6	<ul> <li>Mounting thread M10 to DIN 19213</li> <li>Mounting thread <sup>7</sup>/<sub>16</sub>-20 UNF to IEC 61518</li> </ul>	0 2
Non-wetted parts ma	aterials		• Vent on side of process flange	
Stainless steel proce	ess flange screws	2	- Mounting thread M10 to DIN 19213	4
Further designs Please add "-Z" to Arti Order code.	icle No. and specify	Order code	- Mounting thread // <sub>16</sub> -20 UNF to IEC 61518  Non-wetted parts materials  Stainless steel process flange screws	6
O-rings for process t	flanges		Further designs	Order code
(instead of FPM (Viton	n))		Please add "-Z" to Article No. and specify Order code.	
PTFE (Teflon)     FEP (with silicons or	ore, approved for food)	A20 A21	O-rings for process flanges	
	ound 4079), for measured me-	A21 A22	(instead of FPM (Viton)) • PTFE (Teflon)	A20
dium temperatures -	15 100 °C (5 212 °F)		<ul> <li>FEP (with silicone core, approved for food)</li> </ul>	A21
NBR (Buna N)		A23	<ul> <li>FFPM (Kalrez, compound 4079), for measured medium temperatures -15 100 °C (5 212 °F)</li> </ul>	A22
Inspection certificate	e	C12	• NBR (Buna N)	A23
to EN 10204-3.1			Inspection certificate	C12
Process connection		D16	to EN 10204-3.1	
Remote seal flanges (not together with K01		D20	Remote seal flanges (not together with K01, K02 and K04)	D20
Vent on side for gas	measurements	H02	Vent on side for gas measurements	H02
Process flanges			Stainless steel process flanges for vertical	H03
• with process floage	made of	K00	differential pressure lines	
<ul><li>with process flange</li><li>Hastelloy</li></ul>	made of	K01	(not together with K01, K02 and K04)	
- Monel		K02	Process flanges  • without	K00
- Stainless steel with		K04	with process flange made of	ROU
max. PN 10 (MAW	P 145 psi) of medium 90 °C (194 °F)		- Hastelloy	K01
	er process connection on the		- Monel	K02
side in the middle	of the process flange, vent		<ul> <li>Stainless steel with PVDF insert, max. PN 10 (MAWP 145 psi), max. temperature of medium</li> </ul>	K04
valve not possible			90 °C (194 °F). For ½-14 NPT inner process con-	
1) Not for span 5.3 1	00 bar (76.9 1450 psi)		nection on the side in the middle of the process flange, vent valve not possible	

Not suitable for connection of remote seal
 Only together with max. spans 250, 1600, 5000 and 30000 mbar (100 inH<sub>2</sub>O, 642 inH<sub>2</sub>O, 2000 inH<sub>2</sub>O and 435 psi).

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering	g data	Articl	e No.
			4995 - - 0D
✓ Click on the Article Nation in the PIA Life Cylindrical Control  ✓ Click on the Article Nation in the PIA Life Cylindrical Control  ✓ Click on the Article Nation in the PIA Life Cylindrical Control  ✓ Click on the Article Nation in the PIA Life Cylindrical Cylind	lo. for the online configura- ycle Portal.		
Measuring cell filling Silicone oil	Measuring cell cleaning Normal	1	
Measured span (min	max.)		
2.5 250 mbar 6 600 mbar 16 1600 mbar 50 5000 mbar 0.3 30 bar	(1 100 inH <sub>2</sub> O) (2.4 240 inH <sub>2</sub> O) (6.4 642 inH <sub>2</sub> O) (20 2000 inH <sub>2</sub> O) (4.35 435 psi)	D E F G	
Wetted parts materials	· , ,		
(stainless steel process			
Seal diaphragm	Parts of measuring cell		
Stainless steel Hastelloy Gold <sup>1)</sup>	Stainless steel Stainless steel Gold	A B L	
Process connection Female thread 1/4-18 NP connection	, and the second		
<ul> <li>Sealing screw opposit</li> </ul>	te process connection		
- Mounting thread M1			1
	<sub>3</sub> -20 UNF to IEC 61518		3
<ul> <li>Vent on side of proces</li> <li>Mounting thread M1</li> </ul>	O .		5
O	<sub>3</sub> -20 UNF to IEC 61518		7
Non-wetted parts mate		-	
<ul> <li>Stainless steel proces</li> </ul>			2
Further designs		Orde	r code
Please add "-Z" to Articl code.	e No. and specify Order		
		A20 A21 A22 A23	
Inspection certificate to EN 10204-3.1		C12	
Stainless steel proces differential pressure li		H03	
without process flange		K00	
without process nange	50	KUU	

 $<sup>^{1)}</sup>$  Not together with max. span 600 mbar (240 inH $_2$ O)

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Spare parts/Accessories	, tiolo 1 vo.	Mounting screws	, a tiolo i vo.
Mounting bracket and fastening parts for pressure transmitters SITRANS P DS III with HART, DS III with		For measuring point label, grounding and connection terminals or for display (50 units)	7MF4997-1CD
PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403C.) For absolute pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION		Sealing screws (1 set = 2 units) for process flange • made of stainless steel • made of Hastelloy	7MF4997-1CG 7MF4997-1CH
Fieldbus (7MF423C.)  • made of steel  • made of stainless steel  Mounting bracket and fastening parts	7MF4997-1AB 7MF4997-1AH	Sealing screws with vent valve Complete (1 set = 2 units)  • made of stainless steel  • made of Hastelloy	7MF4997-1CP 7MF4997-1CQ
for pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403A,B, .D. and .F.) For absolute pressure transmitters		Application electronics  • for SITRANS P DS III with HART  • for SITRANS P DS III with PROFIBUS PA  • for SITRANS P DS III with FOUNDATION Fieldbus	7MF4997-1DK 7MF4997-1DL 7MF4997-1DM
SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus 7MF423A.,B.,D. andF.)  • made of steel  • made of stainless steel	7MF4997-1AC 7MF4997-1AJ	Connection board  • for SITRANS P DS III  • for SITRANS P DS III PROFIBUS PA and FOUNDATION Fieldbus	7MF4997-1DN 7MF4997-1DP
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF433 and 7MF443) • made of steel	7MF4997-1AD	O-rings for process flanges made of: FPM (Viton) PTFE (Teflon) FEP (with silicone core, approved for food) FFPM (Kalrez, compound 4079) NBR (Buna N)	7MF4997-2DA 7MF4997-2DB 7MF4997-2DC 7MF4997-2DD 7MF4997-2DE
made of stainless steel	7MF4997-1AK	Sealing ring for process connection	see "Fittings"
Mounting and fastening brackets For differential pressure transmitters with flange thread M12 SITRANS P DS III with HART, DS III with		<ul> <li>Weldable sockets for PMC connection</li> <li>PMC Style Standard: Thread 1½"</li> <li>PMC Style Minibolt: front-flush 1"</li> </ul>	7MF4997-2HA 7MF4997-2HB
PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF453)  • made of steel  • made of stainless steel  Mounting and fastening brackets	7MF4997-1AE 7MF4997-1AL	Gaskets for PMC connection (packing unit = 5 units)  • PTFE seal for PMC Style Standard: Thread 1½"  • Gasket made of Viton for PMC Style Minibolt: front-flush 1"	7MF4997-2HC 7MF4997-2HD
For differential and absolute pressure transmitters with flange thread 7/16-20 UNF SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus		Weldable socket for TG52/50 and TG52/150 connection  • TG52/50 connection  • TG52/150 connection	7MF4997-2HE 7MF4997-2HF
(7MF433, 7MF443 and 7MF453)  • made of steel  • made of stainless steel	7MF4997-1AF 7MF4997-1AM	Seals for TG 52/50 and TG 52/150 made of silicone (FDA compliant)	7MF4997-2HG
Cover made of die-cast aluminum, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus  • without window • with window	7MF4997-1BB 7MF4997-1BE	Seals for flange connection with front-flush diaphragm Material FPM (Viton), 10 units  • DN 25, PN 40 (M11)  • DN 25, PN 100 (M21)  • 1", class 150 (M40)  • 1", class 300 (M45)	7MF4997-2HH 7MF4997-2HJ 7MF4997-2HK 7MF4997-2HL
Cover		Available ex stock	
made of stainless steel, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus  • without window  • with window	7MF4997-1BC 7MF4997-1BF		
Digital indicator Including mounting material for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus	7MF4997-1BR		
Measuring point label • without inscription (5 units) • Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")	7MF4997-1CA 7MF4997-1CB-Z Y.:		

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data Operating Instructions <sup>1)</sup> • for SITRANS P DS III/P410 with HART - German - English	Article No.
• for SITRANS P DS III/P410 with HART - German	
- German	
- French - Spanish - Italian - Chinese  • for SITRANS P DS III/P410 with PROFIBUS PA	A5E00047090 A5E00047092 A5E00053218 A5E00053219 A5E00053220 A5E33328988
- German - English - French - Spanish - Italian - Chinese • for SITRANS P DS III/P410 with FOUNDATION Fieldbus	A5E00053275 A5E00053276 A5E00053277 A5E00053278 A5E00053279 A5E35875441
- German - English - French - Spanish - Italian  Compact operating instructions	A5E00279629 A5E00279627 A5E00279630 A5E00279632 A5E00279631
• English, German, Spanish, French, Italian,	A5E03434626
Dutch • English, Estonian, Latvian, Lithuanian, Polish,	A5E03434631
Romanian, Croatian • English, Bulgarian, Czech, Finnish,	A5E03434645
Slovakian, Slovenian • English, Danish, Greek, Portuguese,	A5E03434656
Swedish, Hungarian  • Korean, Portuguese for Brasil, Russian The compact operating instructions are available in 21 EU languages on the product DVD supplied with each transmitter. They can also be downloaded from the SITRANS P web page.	A5E03693760
Brief instruction (Leporello)	
<ul> <li>German, English</li> <li>for SITRANS P DS III/P410 with HART</li> <li>German, English, French, Italian, Spanish, Portuguese, Chinese</li> <li>for SITRANS P DS III/P410 with PROFIBUS PA</li> <li>German, English, French, Italian, Spanish,</li> </ul>	A5E32868055 A5E32868548
Portuguese, Chinese • for SITRANS P DS III/P410 with FOUNDATION	
Fieldbus - German, English, French, Italian, Spanish, Portuguese, Chinese	A5E33295708
DVD with SITRANS P documentation German, English, French, Spanish, Italian incl. compact operating instructions in 21 EU languages	A5E00090345
Certificates (order only via SAP) instead of Internet download • hard copy (to order) • on DVD (to order)	A5E03252406 A5E03252407
Operating Instructions for replacement of electronics, measuring cell and connection board (only available from the Internet) <sup>1)</sup>	A5E00078060
HART modem with USB interface ▶	7MF4997-1DB
Supplementary electronics for 4-wire	See page 1/185

connection

Available ex stock

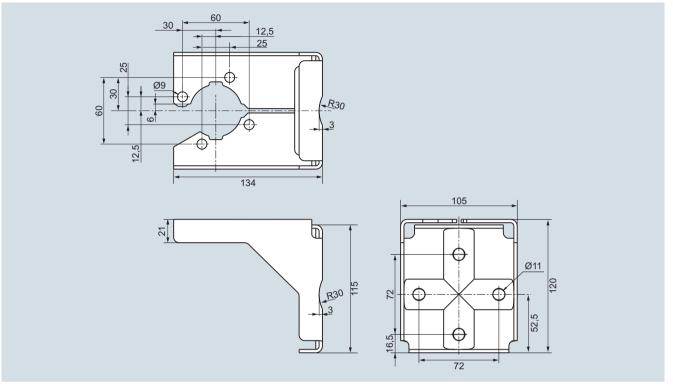
Power supply units see Chap. 7 "Supplementary Components".

1) You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

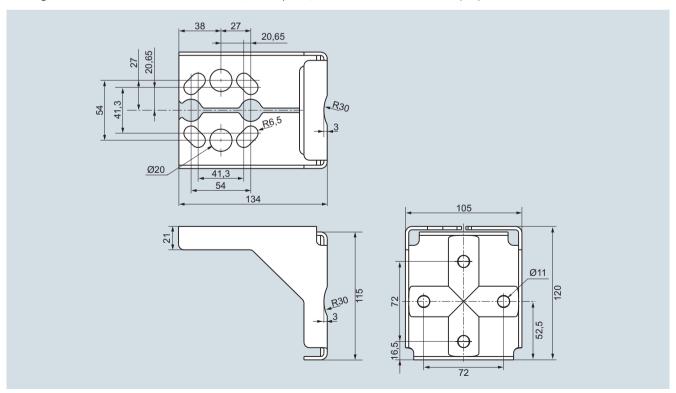
Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III Accessories/Spare Parts

#### Dimensional drawings



Mounting bracket for SITRANS P DS III, SITRANS P410 and SITRANS P280 gauge and absolute pressure-transmitters, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P DS III and SITRANS P410 differential pressure transmitter, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P DS III - Factory-mounting of valve manifolds on transmitters

#### Overview

SITRANS P transmitters

- DS III for relative and absolute pressure (both designs) and
- DS III for differential pressure

can be delivered factory-fitted with the following valve manifolds:

- 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters
- 7MF9411-5BA and 7MF9411-5CA valve manifolds for absolute pressure and differential pressure transmitters

#### Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

The 7MF9411-5BA and 7MF9411-5CA valve manifolds are sealed with PTFE sealing rings between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

#### Selection and Ordering data

# 7MF9411-5AA valve manifold for relative and absolute pressure transmitters



Add "- <b>Z</b> " to the Article No. of the transmitter and add order codes.	Order code
SITRANS P DSIII 7MF4032, 7MF4232, 7MF4033, 7MF4233, 7MF4034, 7MF4234	T05
With process connection oval flange with PTFE gasket and <b>steel</b> mounting screws.	
Delivery including high-presure test certified by factory certificate according to EN 10204-2.2	
Additional versions:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
With manufacturer declaration according to NACE, MR-0175	D07

# 7MF9411-5AA valve manifold for relative and absolute pressure transmitters



1	Add "- <b>Z</b> " to the Article No. of the transmitter and add order codes.	Order code
	SITRANS P DSIII 7MF4032, 7MF4232, 7MF4033, 7MF4233, 7MF4034, 7MF4234	T06
	With process connection oval flange with PTFE gasket and <b>stainless steel</b> mounting screws.	
	Delivery including high-presure test certified by factory certificate according to EN 10204-2.2	
	Additional versions:	
	Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
	Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
	With manufacturer declaration according to NACE, MR-0175	D07

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Factory-mounting of valve manifolds on transmitters

Add 7 to the Article No. of the transposition Order

# 7MF9011-4FA valve manifold on relative and absolute pressure transmitters



Add -Z to the Article No. of the transmitter and add Order codes	Code
SITRANS P DSIII 7MF4031, 7MF4231	T03
With process connection female thread ½-14 NPT in-sealed with PTFE sealing tape	
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
With manufacturer declaration according to NACE, MR-0175	D07

#### 7MF9011-4EA

#### valve manifold on relative and absolute pressure transmitters



Add <b>-Z</b> to the Article No. of the transmitter and add Order codes	Order code
SITRANS P DSIII 7MF4030, 7MF4230 with process connection collar G1/2 A to EN 837-1 with gasket made of PTFE between valve manifold and transmitter	T02
Alternative sealing material:  • Soft iron  • Stainless steel, Mat. No. 14571  • copper  Delivery incl. high-pressure test certified by test report to EN 10204-2.2	A70 A71 A72
Further designs:  Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	A02
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	C12
With manufacturer declaration according to NACE, MR-0175	D07

# 7MF9411-5BA valve manifold on absolute and differential pressure transmitters



	Add <b>-Z</b> to the Article No. of the transmitter and add Order codes	Order code
4	SITRANS P DSIII 7MF433, 7MF443 and 7MF453 1) mounted with gaskets made of PTFE and screws made of • chromized steel • made of stainless steel Delivery incl. high-pressure test certified by test report to EN 10204-2.2	U01 U02
	Further designs:	
	Delivery includes mounting bracket and mounting clips made of • Steel • Stainless steel (instead of the mounting bracket supplied with the transmitter)	A01 A02
	Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	C12
	With manufacturer declaration according to NACE, MR-0175	D07

# 7MF9411-5CA valve manifold on differential pressure transmitters



6	$\operatorname{\sf Add} \operatorname{\textbf{-Z}}$ to the Article No. of the transmitter and add Order codes	Order code
	SITRANS P DSIII 7MF443 and 7MF4531 1) mounted with gaskets made of PTFE and screws made of • chromized steel • Stainless steel Delivery incl. high-pressure test certified by test report to EN 10204-2.2	U03 U04
	Further designs:	
	Delivery includes mounting bracket and mounting clips made of • Steel • Stainless steel (instead of the mounting bracket supplied with the transmitter)	A01 A02
	Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	C12
	With manufacturer declaration according to NACE, MR-0175	D07

<sup>1)</sup> For 7MF453.-... transmitters, you require a 7/10-20 UNF connection thread in the process flange

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P DS III - Factory-mounting of valve manifolds on transmitters

# Dimensional drawings

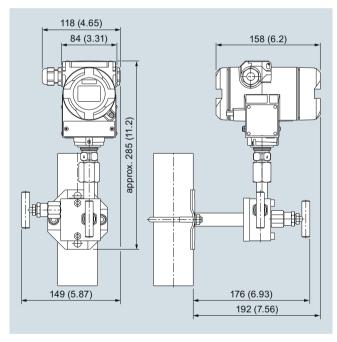
#### Valve manifolds mounted on SITRANS P DS III



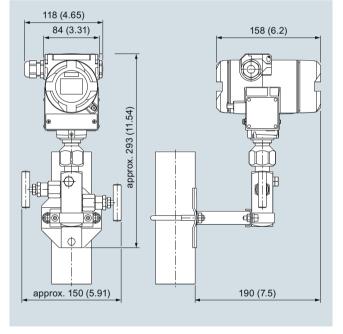
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



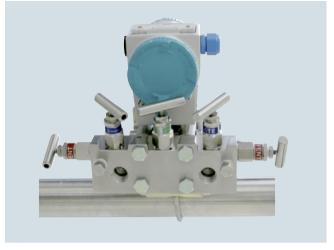
7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

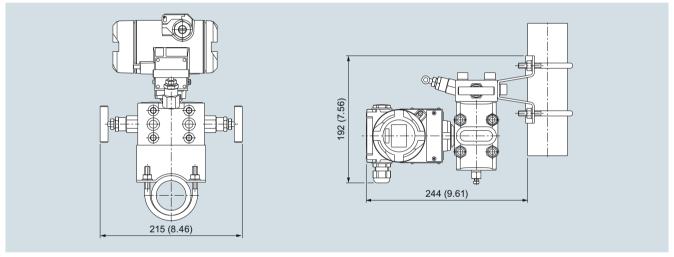
### SITRANS P DS III - Factory-mounting of valve manifolds on transmitters



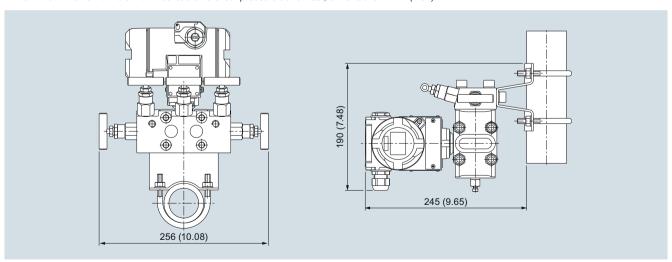
7MF9411-5BA valve manifold with mounted differential pressure transmitter



7MF9411-5CA valve manifold with mounted differential pressure transmitter



7MF9411-5BA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)



7MF9411-5CA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 - Technical description

#### Overview



SITRANS P410 pressure transmitters are digital pressure transmitters with a high level of operating convenience. Technically, they are based on the SITRANS P DS III but offer an increased measuring accuracy of 0.04%. This means the SITRANS P 410 is perfectly suited for measuring tasks with increased accuracy requirements. The parameterization is performed using input buttons or via HART or via PROFIBUS PA or FOUNDATION Fieldbus interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very simple, despite the variety of setting options.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed in hazardous areas (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the respective harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P410 pressure transmitters are available in various versions for measuring:

- · Gauge pressure
- Differential pressure
- · Volume flow
- Mass flow

#### Benefits

- High quality and service life
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- · Minimal conformity error
- · Good long-term stability
- Wetted parts made of high-grade materials (e.g., stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 160 bar (0.15 psi to 2321 psi) for P410 with HART interface
- Nominal measuring ranges from 1 bar to 160 bar (14.5 psi to 2321 psi) for P410 with PROFIBUS PA and FOUNDATION Fieldbus interface
- · High measuring accuracy
- Parameterization over input buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus interface.

#### Application

SITRANS P410 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the P410 suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Flameproof enclosure" may be installed in hazardous areas (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART or over PROFIBUS PA or FOUNDATION Fieldbus interface.

#### Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

for P410 with HART: 0.01 bar to 160 bar (0.15 psi to 2321 psi)

Nominal measuring range for P410 with PROFIBUS PA and FOUNDATION Fieldbus: 1 bar to 160 bar (14.5 psi to 2321 psi)

#### Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow q ~  $\sqrt{\Delta p}$  (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)

for P410 with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range for P410 with PROFIBUS PA and FOUNDATION Fieldbus: 20 mbar ... 30 bar (0.29 ... 435 psi)

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 - Technical description

#### Design



Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

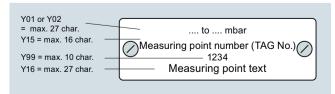
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

#### Example for an attached measuring point label

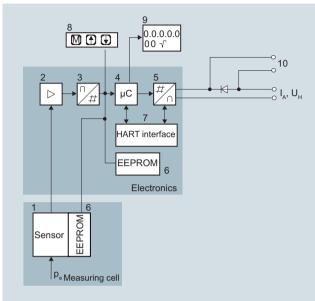


Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 - Technical description

#### Function

#### Operation of electronics with HART communication



- 1 Measuring cell sensor
- 2 Instrument amplifier
- 3 Analog-to-digital converter
- 4 Microcontroller
- 5 Digital-to-analog converter
- 6 One non-volatile memory each in the measuring cell and electronics
- 7 HART interface
- 8 Three input keys (local operation)
- 9 Digital display
- 10 Diode circuit and connection for external ammeter
- I Output current
- U<sub>H</sub> Power supply
- P Input variable

#### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

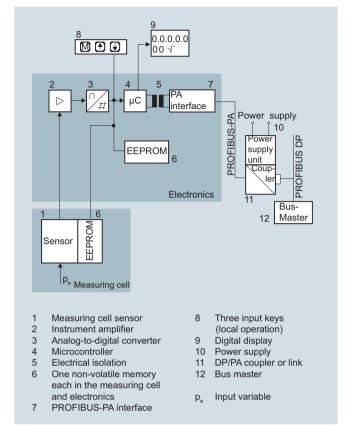
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans  $\leq$  63 bar measure the input pressure compared to atmosphere, transmitters with spans  $\geq$  160 bar compared to vacuum.

#### Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

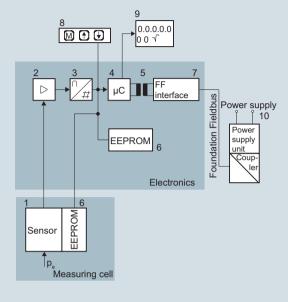
Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 - Technical description

# Operation of electronics with FOUNDATION Fieldbus communication



- 1 Measuring cell sensor
- 2 Instrument amplifier
- 3 Analog-to-digital converter
- 4 Microcontroller
- 5 Electrical isolation
- 6 One non-volatile memory each in the measuring cell and electronics
- 7 FF interface

- 8 Three input keys (local operation)
- 9 Digital display
- 10 Power supply
- p<sub>e</sub> Input variable

#### Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

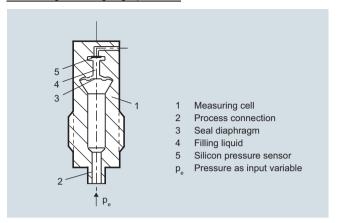
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

#### Mode of operation of the measuring cells

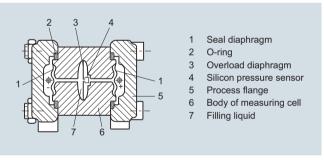
Measuring cell for gauge pressure



Measuring cell for gauge pressure, function diagram

The pressure  $p_e$  is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

#### Measuring cell for differential pressure and flow



Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

Transmitters for applications with advanced requirements (Advanced)

### **SITRANS P410 - Technical description**

#### Parameterization SITRANS P410

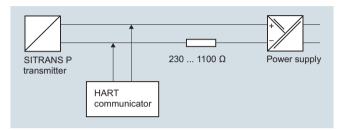
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

#### Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

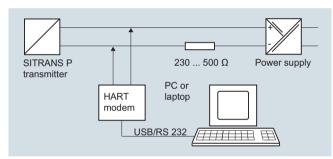
#### Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

#### Adjustable parameters, SITRANS P410 with HART

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Parameters	Input keys (DS III HART)	HART communication		
Start of scale	Х	Х		
Full-scale value	X	X		
Electrical damping	X	X		
Start-of-scale value without application of a pressure ("Blind setting")	Х	X		
Full-scale value without application of a pressure ("Blind setting")	Х	X		
Zero adjustment	X	X		
current transmitter	X	X		
Fault current	X	X		
Disabling of buttons, write protection	Х	x <sup>1)</sup>		
Type of dimension and actual dimension	X	X		
Characteristic (linear / square-rooted)	x <sup>2)</sup>	x <sup>2)</sup>		
Input of characteristic		X		
Freely-programmable LCD		X		
Diagnostic functions		X		

<sup>1)</sup> Cancel apart from write protection

Only differential pressure

#### Diagnostic functions for SITRANS P410 with HART

- Zero correction display
- Event counter
- Limit transmitter
- · Saturation alarm
- Slave pointer
- · Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P410 with HART

Physical variable	Physical dimensions		
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², inH <sub>2</sub> O, inH <sub>2</sub> O (4 °C), mmH <sub>2</sub> O, ftH <sub>2</sub> O (20 °C), inHg, mmHg		
Level (height data)	m, cm, mm, ft, in		
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid		
Mass	g, kg, t, lb, Ston, Lton, oz		
volume flow	$\rm m^3/d,m^3/h,m^3/s,l/min,l/s,ft^3/d,ft^3/min,ft^3/s,US$ gallon/min, US gallon/s		
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min		
Temperature	K, °C, °F, °R		
Miscellaneous	%, mA		

#### Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Through the PROFIBUS the DS III with PROFIBUS PA is connected to a process control system, e. g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

#### Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

# Adjustable parameters for SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

Parameters	Input keys	PROFIBUS PA and FOUNDATION Field-bus interface
Electrical damping	Х	X
Zero adjustment (correction of position)	X	Х
Buttons and/or function disabling	X	X
Source of measured-value display	X	X
Physical dimension of display	X	X
Position of decimal point	X	X
Bus address	X	X
Adjustment of characteristic	X	X
Input of characteristic		X
Freely-programmable LCD		Х
Diagnostics functions		х

Transmitters for applications with advanced requirements (Advanced)

### **SITRANS P410 - Technical description**

Diagnostic functions for SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mmH $_2$ O, mmH $_2$ O (4 °C), inH $_2$ O, inH $_2$ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Volume	m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , US gallon, lmp. gallon, bushel, barrel, barrel liquid
volume flow	m³/s, m³/min, m³/h, m³/d, l/s, l/min, l/h, l/d, Ml/d, ft³/s, ft³/min, ft³/h, ft³/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P410 for gauge pressure

# Technical specifications

SITRANS P410 for gauge pressure				
Input				
Measured variable	Gauge pressure			
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 1 bar 1 100 kPa 0.15 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
	0.04 4 bar 4 400 kPa 0.58 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 16 bar 16 1600 kPa 2.3 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
	0.63 63 bar 63 6300 kPa 9.1 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7MPa 972 psi	100 bar 10 MPa 1450 psi
	1.6 160 bar 0.16 16 MPa 23 2321 psi	160 bar 16 MPa 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 2.5 MPa 3626 psi
Lower measuring limit			'	1
Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0	.44 psia		
Upper measuring limit	100 % of max. span			
Output	HART		PROFIBUS PA/FOU	NDATION Fieldbus
Output signal	4 20 mA		Digital PROFIBUS PA	and FOUNDATION
Lower limit (infinitely adjustable)	3.55 mA, factory pre	set to 3.84 mA	-	
Upper limit (infinitely adjustable)	23 mA, factory prese optionally set to 22.0		-	
Load				
Without HART	$R_{\rm B} \leq (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V			
• With HART		$_{\rm B}$ = 230 500 $_{\rm \Omega}$ (SIMATIC PDM) or $_{\rm B}$ = 230 1100 $_{\rm \Omega}$ (HART Communication)		
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	s)		

Transmitters for applications with advanced requirements (Advanced)

#### SITRANS P410 for gauge pressure

#### SITRANS P410 for gauge pressure

#### Measuring accuracy

Reference conditions

Measuring span ratio r (spread, Turn-Down)

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi

Influence of ambient temperature (in percent per 28 °C (50 °F))

• 1 bar/100 kPa/14.5 psi

• 4 bar/400 kPa/58 psi 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi

Long-term stability (temperature change ± 30 °C (± 54 °F))

• 1 bar/100 kPa/14.5 psi 4 bar/400 kPa/58 psi

 16 bar/1.6 MPa/232 psi 63 bar/6.3 MPa/914 psi 160 bar/16 MPa/2321 psi

Effect of mounting position

Effect of auxiliary power supply (in percent per change in voltage)

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

Acc. to IEC 60770-1

• Increasing characteristic

Start-of-scale value 0 bar/kPa/psi

Stainless steel seal diaphragm

Silicone oil filling
Room temperature 25 °C (77 °F)

r = max. measuring span/set measuring span or nom. pressure range

r≤5: ≤ 0.04 %

5 < r ≤ 100 :  $\leq$  (0.004 · r + 0.045) %

 $\leq$  (0.05 · r + 0.1) %

≤ (0.025 · r + 0.125) %

 $\leq$  (0.25 · r) % in 5 years

 $\leq$  (0.125 · r) % in 5 years

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination

(zero point correction is possible with position error compensation)

0.005 % per 1 V

3 · 10<sup>-5</sup> of nominal measuring range

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P410 for gauge pressure

SITRANS P410 for gauge pressure			
Rated conditions			
Degree of protection (to EN 60529)	e of protection (to EN 60529) IP66 (optional IP66/IP68), NEMA 4X		
Temperature of medium			
Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F)		
Measuring cell with inert filling liquid	-20 +100 °C (-4 +212 °F)		
• In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)		
Ambient conditions			
Ambient temperature			
- Transmitter	-40 +85 °C (-40 +185 °F)		
- Display readable	-30 +85 °C (-22 +185 °F)		
Storage temperature	-50 +85 °C (-58 +185 °F)		
Climatic class			
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for us	e in the tropics	
Electromagnetic Compatibility			
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21		
Design			
Weight (without options)	Die-cast aluminum: $\approx$ 2.0 kg ( $\approx$ 4.4 lb) Stainless steel precision casting: $\approx$ 4.6 kg	(≈ 10.1 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408		
Wetted parts materials			
Connection shank	Stainless steel, mat. no. 1.4404/316L or H	lastelloy C4, mat. no. 2.4610	
Oval flange	Stainless steel, mat. no. 1.4404/316L		
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or H	lastelloy C276, mat. no. 2.4819	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measureme (140 °F))	nt pressure 100 bar (1450 psi) at 60 °C	
Process connection	Connection shank G½B to DIN EN 837-1, (PN 160 (MAWP 2320 psi)) to DIN 19213 to EN 61518		
Material of mounting bracket			
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plat	ted	
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS	304)	
Power supply <i>U</i> <sub>H</sub>	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-	
Power supply		Supplied through bus	
Separate 24 V power supply necessary	-	No	
Bus voltage			
• Not Ex	-	9 32 V	
With intrinsically-safe operation	-	9 24 V	
Current consumption			
Basic current (max.)	-	12.5 mA	
• Start-up current ≤ basic current	-	Yes	
Max. current in event of fault	-	15.5 mA	
Fault disconnection electronics (FDE) available	-	Yes	

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 for gauge pressure		
SITRANS P410 for gauge pressure		
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of farticle 3, paragraph 3 (sound engineerin	uid group 1; complies with requirements of g practice)
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatu -40 +70 °C (-40 +158 °F) temperatu -40 +60 °C (-40 +140 °F) temperatu	re class T5;
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $P_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 174 \text{ mA}$ , $P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 \text{ nF}$
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatu -40 +60 °C (-40 +140 °F) temperatu	
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC	To circuits with values: $U_{\rm H}$ = 9 32 V DC
<ul> <li>Dust explosion protection for zone 20 (pending)</li> </ul>	PTB 01 ATEX 2055	
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $P_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V, } I_0 = 380 \text{ mA, } P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V, } I_0 = 250 \text{ mA, } P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4  {\rm mH},  C_{\rm i} = 6  {\rm nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$
<ul> <li>Dust explosion protection for zone 21/22 (pending)</li> </ul>	PTB 01 ATEX 2055	
- Marking	Ex II 2 D Ex tb IIIC T120°C Db	
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 V DC; $P_{\rm max}$ = 1.2 W	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$ ; $P_{\text{max}} = 1 \text{ W}$
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	$U_{\rm m} = 45  {\rm V}$	$U_{\rm m} = 32 \text{ V}$
- Connections (Ex ic)	To circuits with values: $U_i = 45 \text{ V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V}$ , $I_0 = 570 \text{ mA}$ Linear barrier:
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}, C_i = 6 \text{ nF}$	$U_0 = 32 \text{ V}, I_0 = 132 \text{ mA}, P_0 = 1 \text{ W}$ $L_i = 7 \mu\text{H}, C_i = 1.1 \text{ nF}$
Explosion protection acc. to FM (pending)	Certificate of Compliance 3008490	$L_{\parallel} = I \mu \Pi, O_{\parallel} = 1.11\Pi$
- Identification (XP/DIP) or (IS); (NI)	· ·	1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC L II, DIV 2, GP FG; CL III

- Explosion protection to CSA (pending)
- Identification (XP/DIP) or (IS)

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Transmitters for applications with advanced requirements (Advanced)

		SITRA	NS P410 for gauge pressure
HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for computer	SIMATIC PDM	Analog input	
PROFIBUS PA communication		- Adaptation to customer-specif-	Yes, linearly rising or falling
Simultaneous communication with master class 2 (max.)	4	ic process variables	characteristic
The address can be set using	Configuration tool or local opera-	- Electrical damping, adjustable	0 100 s
mo address sam 20 set demig	tion (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or		value)
• Input byte	10 (two measured values)  0, 1, or 2 (register operating mode and reset function for	- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively
	metering)	- Square-rooted characteristic for flow measurement	Yes
Internal preprocessing		PID	Standard FOUNDATION
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Fieldbus function block
	3.0, class B	<ul> <li>Physical block</li> </ul>	1 resource block
Function blocks	2	Transducer blocks	1 transducer block Pressure with
Analog input			calibration, 1 transducer block LCD
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Simulation function: Measured pressure value, sensor temper-	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electronics temperature	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
Physical block	1		

Transducer blocks

two pressures

characteristic with - Square-rooted characteristic for flow measurement - Gradual volume suppression

sor temperature

• Pressure transducer block - Can be calibrated by applying

- Monitoring of sensor limits

- Specification of a container

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

Yes

Yes

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P410 for gauge pressure

Selection and Ordering data		Article No.			Order code
Pressure transmitter for gauge pressure, SITRANS P410 with HART		7MF4033-			-Z C41
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Measuring cell filling Measuring cell cleaning					
Silicone oil normal	•	1			
Measuring span (min max.)					
0.01 1 bar (0.15 14.5 psi)	•		3		
0.04 4 bar (0.58 58 psi)			2		
0.16 16 bar (2.32 232 psi)			) E		
0.63 63 bar (9.14 914 psi) 1.6 160 bar (23.2 2320 psi)					
Wetted parts materials  Coal displacement of the coal approach of the co					
Seal diaphragm Process connection					
Stainless steel Stainless steel	•		A		
Hastelloy Stainless steel			В		
Hastelloy Version as diaphragm seal <sup>1) (2) (3) (4)</sup>			C		
version as diaphragm sear			4		
Process connection					
Connection shank G½B to EN 837-1     Female thread ½-14 NPT	•		0 1		
Stainless steel oval flange with process connection (Oval flange has no female thread)			' '		
- Mounting thread <sup>7</sup> / <sub>16</sub> -20 UNF to IEC 61518			2		
- Mounting thread M10 to DIN 19213			3		
- Mounting thread M12 to DIN 19213			4		
• Male thread M20 x 1.5			5		
<ul> <li>Male thread ½ -14 NPT</li> </ul>			6		
Non-wetted parts materials					
Housing made of die-cast aluminium	▶		0		
<ul> <li>Housing stainless steel precision casting<sup>5)</sup></li> </ul>			3		
Version					
• Standard version, German plate inscription, setting for pressure unit: bar				1	
• International version, English plate inscription, setting for pressure unit: bar	<b></b>			2	
Chinese version, English plate inscription, setting for pressure unit: Pascal	0			3	
All versions include DVD with documentation for SITRANS P in German, English, French, Italian and nish. Includes Compact operating instructions in 21 EU languages.	Spa-				
Explosion protection  None					
With ATEX, Type of protection:				Α	
- "Intrinsic safety (Ex ia)"				В	
- "Explosion-proof (Ex d)" <sup>6)</sup>				D	
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"7)				Р	
- "Ex nA/ic (Zone 2)" <sup>8)</sup>				E	
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection	<b>&gt;</b>			R	
(Ex ia + Ex d + Zone $1D/2D)^{*}/9$ ) (pending)					
<ul> <li>FM + CSA intrinsic safe (is) (pending)</li> <li>FM + CSA (is + ep) + Ex ia + Ex d (ATEX)<sup>9)</sup> (pending)</li> </ul>				F S	
With FM + CSA, Type of protection:  (Perfully)				3	
- "Intrinsic Safe and Explosion Proof (is + xp)" <sup>6)</sup> (pending)				NC	
Electrical connection / cable entry					
• Screwed gland Pg 13.5 (adapter) <sup>10)</sup>				A	
Screwed gland M20 x1 .5	<b>&gt;</b>			В	
• Screwed gland ½-14 NPT				C	
• Han 7D plug (plastic housing) incl. mating connector 10)				D	
• M12 connectors (stainless steel) <sup>10)11)</sup>				F	

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P410 for gauge pressure

Selection and Ordering data		Article No.	Order code
Pressure transmitter for gauge pressure, SITRANS P410 with HART		7MF4033-	-Z C41
Display			
Without display		0	
<ul> <li>Without visible display (display concealed, setting: mA)</li> </ul>	•	1	
With visible display (setting: mA)		6	
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7	

Available ex stock

Power supply units see Chap. 7 "Supplementary Components".

# Included in delivery of the device: • Brief instructions (Leporello)

- DVD with detailed documentation
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-..Y..-... and 7MF4900-1...-.B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- $^{10)}$ Only in connection with Ex approval A, B or E.
- <sup>11)</sup>M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

# SITRANS P410 for gauge pressure

Selection and Ordering	data	Article No.		Order code
Pressure transmitter for	gauge pressure			
SITRANS P410 with PRO	7MF4034-		-Z C41	
SITRANS P410 with FOUR	NDATION Fieldbus (FF)	7MF4035-		-Z C41
	for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling Silicone oil	Measuring cell cleaning normal	1		
Nominal measuring ran	ge			
1 bar (14.5 psi) 4 bar (58 psi)		B C		
16 bar (232 psi)		D		
63 bar (914 psi)		E		
160 bar (2320 psi)		F		
Wetted parts materials	<b>D</b>			
Seal diaphragm	Process connection			
Stainless steel Hastelloy	Stainless steel Stainless steel	A B		
Hastelloy	Hastelloy	C		
Version as diaphragm sea	al 1) 2) 3) 4)	Y		
Process connection				
• Connection shank G½E		0		
• Female thread ½-14 NF	T ge with process connection (Oval flange has no female thread) <sup>5)</sup>	1		
<ul> <li>Mounting thread <sup>7</sup>/<sub>16</sub>-2</li> </ul>		2		
- Mounting thread M10		3		
- Mounting thread M12	to DIN 19213	4		
Male thread M20 x 1.5		5		
• Male thread ½ -14 NPT		6		
Non-wetted parts mater		0		
<ul><li>Housing made of die-ca</li><li>Housing stainless steel</li></ul>		0		
Version	provision dusting	_		
<ul> <li>Standard version, Germ</li> </ul>		1		
	nglish label inscription, setting of pressure unit: psi		2	
	label inscription, setting of pressure unit: kPa		3	
	documentation for SITRANS P in German, English, French, Italian and Spanish. estructions in 21 EU languages.			
Explosion protection	istabilitis in 21 E0 languages.	_		
• •			Α	
	None     Note ATTY Type of gustastics			
<ul> <li>With ATEX, Type of prot</li> <li>"Intrinsic safety (Ex ia)</li> </ul>			В	
- "Explosion-proof (Ex c			D	
<ul> <li>"Intrinsic safety and flag</li> </ul>	ameproof enclosure" (Ex ia + Ex d)"7)		P	
- "Ex nA/ic (Zone 2)"8)			E	
<ul> <li>"Intrinsic safety, explo</li> <li>(Ex ia + Ex d + Zone)</li> </ul>	sion-proof enclosure and dust explosion protection 1D/2D)* <sup>7)9)</sup> (not for P410 with FOUNDATION Fieldbus) (pending)		R	
• FM + CSA intrinsic safe			F	
• FM + CSA (is + ep) + E	x ia + Ex d (ATEX) <sup>9)</sup> (pending)		s	
• With FM + CSA, Type of			NC	
Electrical connection/ca	,			
<ul> <li>Screwed gland M20 x 1</li> </ul>	•		В	
• Screwed gland ½-14 NI	PT		С	
M12 connectors (stainle	ess steel) <sup>10) 11)</sup>		F	

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

Selection and Ordering data	Article No.	Order code
Pressure transmitter for gauge pressure		
SITRANS P410 with PROFIBUS PA (PA)	7MF4034-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)	7MF4035-	-Z C41
		•
Display		
Without display		0
<ul> <li>Without visible display (display concealed, setting: bar)</li> </ul>		1
With visible display (setting: bar)		6
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" required)</li> </ul>		7

Included in delivery of the device:

- Brief instructions (Leporello)
  DVD with detailed documentation
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-.Y..-.... and 7MF4900-1...-.B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) M10 fastening thread: Max. span 160 bar (2320 psi) 7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- 6) Without cable gland, with blanking plug.
- 7) With enclosed cable gland Ex ia and blanking plug.
- 8) Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- <sup>10)</sup>M12 delivered without cable socket.
- <sup>11)</sup>Only in connection with Ex approval A, B, E or F.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Pressure transmitter with mounting				
bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut,				
2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel	A02	✓	✓	✓
Plug	• • • •			
Han 7D (metal)      Han 9D (instead of Han 7D)	A30 A31	4		
<ul><li>Han 8D (instead of Han 7D)</li><li>Angled</li></ul>	A32	· /		
Han 8D (metal)	A33	1		
Cable sockets for M12 connectors	A50	✓	✓	✓
(metal (CuZn))				
Rating plate inscription (instead of German)				
• English	B11	1	1	1
• French	B12	✓	✓	✓
Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
English rating plate	B21	✓	✓	✓
Pressure units in inH <sub>2</sub> 0 and/or psi	011			
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup>	C11	✓	✓	✓
Inspection certificate <sup>2)</sup>	C12	✓	✓	✓
Acc. to EN 10204-3.1				
Factory certificate	C14	✓	✓	✓
Acc. to EN 10204-2.2				
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	<b>✓</b>		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
Increased measuring accuracy (mandatory specification for SITRANS P410)	C41	✓	✓	✓
Device passport Russia	C99	✓	1	1
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Supplied with oval flange	D37	✓	1	1
(1 item), PTFE packing and screws in thread of oval flange				
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
TAG plate empty (no inscription)	D61	✓	1	✓

Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Use in or on zone 1D/2D	E01	1	✓	✓
(only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)" and IP66)				
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4B)	E55 <sup>3)</sup>	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4D)	E56 <sup>3)</sup>	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China)	E57 <sup>3)</sup>	1	1	1
(only for transmitter 7MF4)	20,	Ť	·	·
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)	E58 <sup>3)</sup>	✓	✓	✓
(only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (pending) (only for transmitter 7MF4[B, D]Z + E11)	E70 <sup>3)</sup>	<b>✓</b>	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>4)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	1	✓	✓
Oval flange NAM (ASTAVA)	J06	1	✓	✓

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/193).

When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

<sup>2)</sup> If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

<sup>3)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>4)</sup> Approval pending.

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 for gauge pressure

Selection and Ordering data	Order	code		
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set  Specify in plain text (max. 5 characters): Y01: up to mbar, bar, kPa, MPa, psi	Y01	<b>√</b>	<b>√</b> 1)	
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable)  Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG)	Y17	✓		
Max. 8 characters, specify in plain text: Y17:				
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, Note:				
The following pressure units can be selected:				
bar, mbar, mm ${\rm H_2O}^*$ ), in ${\rm H_2O}^*$ ), ft ${\rm H_2O}^*$ ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C				
Setting of pressure indication in non-pressure units <sup>2</sup> )  Specify in plain text: Y22: up to I/min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	1		

✓ = available

### Ordering example

Item line: 7MF4033-1EA00-1AA7-Z C41

B line: A01 + Y01 + Y21

C line: Y01: 10 ... 20 bar (145 ... 290 psi)

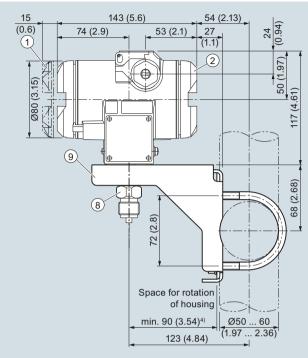
C line: Y21: bar (psi)

Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
 Preset values can only be changed over SIMATIC PDM.

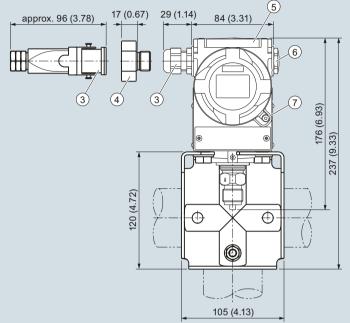
Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for gauge pressure

### Dimensional drawings



- (longer overall length for cover with window)<sup>1)</sup>
- 2 Terminal side<sup>1)</sup>
- (3) Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/Han 8D<sup>2)3)</sup> plug
- (4) Harting adapter
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- 2) Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- 4) Minimum distance for rotating



- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Process connection: Connection shank G½B
- 9 Mounting bracket (option)

SITRANS P410 pressure transmitters for gauge pressure, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

## Technical specifications

SITRANS P410 for differential pressure and flow			
Input			
Measured variable	Differential pressure	and flow	
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 97/23/EC Pressure Equipment Directive)	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)
	2.5 250 mbar 0.2 25 kPa 1 100 inH <sub>2</sub> O	250 mbar 25 kPa 100 inH <sub>2</sub> O	160 bar 16 MPa 2320 psi
	6 600 mbar 0.6 60 kPa 2.4 240 inH <sub>2</sub> O	600 mbar 60 kPa 240 inH <sub>2</sub> O	
	16 1600 mbar 1.6160 kPa 6.4 642 inH <sub>2</sub> O	1600 mbar 160 kPa 642 inH <sub>2</sub> O	
	50 5000 mbar 5 500 kPa 20 2000 inH <sub>2</sub> O	5000 mbar 500 kPa 2000 inH <sub>2</sub> O	
	0.3 30 bar 0.03 3 MPa 4.35 435 psi	30 bar 3 MPa 435 psi	
	6 600 mbar 0.6 60 kPa 2.4 240 inH <sub>2</sub> O	600 mbar 60 kPa 240 inH <sub>2</sub> O	420 bar 42 MPa 6091 psi
	16 1600 mbar 1.6 160 kPa 6.4 642 inH <sub>2</sub> O	1600 mbar 160 kPa 642 inH <sub>2</sub> O	
	50 5000 mbar 5 500 kPa 20 2000 inH <sub>2</sub> O	5000 mbar 500 kPa 2000 inH <sub>2</sub> O	
	0.3 30 bar 0.03 3 MPa 4.35 435 psi	30 bar 3 MPa 435 psi	
Lower measuring limit			
Measuring cell with silicone oil filling	-100 % of max. spar or 30 mbar a/3 kPa		ng cell 30 bar/3 MPa/435 psi)
Upper measuring limit	100 % of max. span		
Start of scale value	Between the measu	ring limits (fully adjust	able)
Output	HART		PROFIBUS PA/ FOUNDATION Fieldbus
Output signal	4 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal
Lower limit (infinitely adjustable)	3.55 mA, factory pre	eset to 3.84 mA	-
Upper limit (infinitely adjustable)	23 mA, factory pres optionally set to 22.0		-
Load			
Without HART	$R_{\rm B} \le (U_{\rm H} - 10.5 \text{ V})/0$ $U_{\rm H}$ : Power supply in		-
With HART	$R_{\rm B} = 230 \dots 500 \Omega$ ( $R_{\rm B} = 230 \dots 1100 \Omega$ tor)	SIMATIC PDM) or (HART Communica-	-
Physical bus	-		IEC 61158-2
Protection against polarity reversal		hort-circuit and polarit painst the other with m	
Electrical damping (step width 0.1 s)	Set to 2 s (0 100 s	s)	

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

### SITRANS P410 for differential pressure and flow

#### Measuring accuracy

Reference conditions

Measuring span ratio r (spread, Turn-Down)

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

250 mbar/25 kPa/3.63 psi
 600 mbar/60 kPa/8.7 psi
 1600 mbar/160 kPa/23.21 psi
 5 bar/500 kpa/72.5 psi
 30 bar/3 MPa/435 psi

• Square-rooted characteristic (flow > 50 %)

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi

 Square-rooted characteristic (flow > 25 ... 50 %)

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi

Influence of ambient temperature (in percent per 28 °C (50 °F))

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi

Influence of static pressure

• on the zero point (PKN)

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi

 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi

• on the span (PKS)

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi 30 bar/3 MPa/435 psi

Long-term stability (temperature change ± 30 °C (± 54 °F))

 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kpa/72.5 psi

• 30 bar/3 MPa/435 psi

Effect of mounting position (in pressure per change in angle)

Effect of auxiliary power supply (in percent per change in voltage)

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

Acc. to IEC 60770-1

• Increasing characteristic

Start-of-scale value 0 bar/kPa/psi

Stainless steel seal diaphragm

· Silicone oil filling

• Room temperature 25 °C (77 °F)

r = max. measuring span/set measuring span or nom. pressure range

 $r \le 5$ :  $\le 0.04$  %

 $5 < r \le 100$ :  $\le (0.004 \cdot r + 0.045)$  %

 $r \le 5$ :  $\le 0.04 \%$ 

 $5 < r \le 100$ :  $\le (0.004 \cdot r + 0.045)$  %

 $r \le 5$ :  $\le 0.08 \%$ 

 $5 < r \le 100$ :  $\le (0.008 \cdot r + 0.09) \%$ 

 $\leq$  (0.025 · r + 0.125) %

 $\leq$  (0.1 · r) % per 70 bar

(zero-point correction is possible with position error adjustment)

≤ (0.2 · r) % per 70 bar

(zero-point correction is possible with position error adjustment)

≤ 0.14 % per 70 bar

Static pressure max. 70 bar/7 MPa/1015 psi

≤ (0.125 · r) % in 5 years

≤ (0.25 · r) % in 5 years

 $\leq$  0.7 mbar/0.07 kPa/0.028 inH $_2{\rm O}$  per 10° inclination (zero-point correction is possible with position error adjustment)

0.005 % per 1 V

3 · 10<sup>-5</sup> of nominal measuring range

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 for differential pressure and flow				
Rated conditions				
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X			
Temperature of medium				
Measuring cell with silicone oil filling	-40 +100 °C (-40 +212 °F) -20 +100 °C (-4 +212 °F) with 30 bar measuring cell			
In conjunction with dust explosion protection	-20 +60 °C (-4 +140 °F)			
Ambient conditions				
Ambient temperature				
- Transmitter	-40 +85 °C (-40 +185 °F)			
- Display readable	-30 +85 °C (-22 +185 °F)			
Storage temperature	-50 +85 °C (-58 +185 °F)			
Climatic class				
- Condensation	Relative humidity 0 100 % Condensation permissible, suitable for us	se in the tropics		
Electromagnetic Compatibility				
<ul> <li>Emitted interference and interference immunity</li> </ul>	Acc. to IEC 61326 and NAMUR NE 21			
Design				
Weight (without options)	Die-cast aluminum: $\approx$ 4.5 kg ( $\approx$ 9.9 lb) Stainless steel precision casting: $\approx$ 7.1 kg ( $\approx$ 15.6 lb)			
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408			
Wetted parts materials				
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819			
<ul> <li>Process flanges and sealing screw</li> </ul>	Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4610			
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR			
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measureme (140 °F))	ent pressure 100 bar (1450 psi) at 60 °C		
Process connection	Female thread $\frac{1}{4}$ -18 NPT and flange conr DIN 19213 or $\frac{7}{16}$ -20 UNF to IEC 61518	nection with mounting thread M10 to		
Material of mounting bracket				
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-pla	ted		
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS	304)		
Power supply $U_{H}$	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Terminal voltage on transmitter	10.5 45 V DC 10.5 30 V DC in intrinsically-safe mode	-		
Power supply		Supplied through bus		
Separate 24 V power supply necessary	-	No		
Bus voltage				
• Not Ex	-	9 32 V		
With intrinsically-safe operation	-	9 24 V		
Current consumption				
Basic current (max.)	-	12.5 mA		
• Start-up current ≤ basic current	-	Yes		
Max. current in event of fault	-	15.5 mA		
Fault disconnection electronics (FDE) available	-	Yes		

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 for differential pressure and flo	ow	
SITRANS P410 for differential pressure and flow		
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of 1 article 3, paragraph 3 (sound engineering	fluid group 1; complies with requirements of ng practice)
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatu -40 +70 °C (-40 +158 °F) temperatu -40 +60 °C (-40 +140 °F) temperatu	ure class T5;
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW; $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}$ , $I_0 = 380 \text{ mA}$ , $P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}$ , $I_0 = 250 \text{ mA}$ , $P_0 = 1.2 \text{ W}$
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 \text{ nF}$
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F) temperatu -40 +60 °C (-40 +140 °F) temperatu	ure class T6
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 NDC	To circuits with values: $U_{\rm H}$ = 9 32 V DC
Dust explosion protection for zone 20 (pending)	PTB 01 ATEX 2055	
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: $U_{\rm i}$ = 30 V, $I_{\rm i}$ = 100 mA, $P_{\rm i}$ = 750 mW, $R_{\rm i}$ = 300 $\Omega$	FISCO supply unit: $U_0 = 17.5 \text{ V}, I_0 = 380 \text{ mA}, P_0 = 5.32 \text{ W}$ Linear barrier: $U_0 = 24 \text{ V}, I_0 = 250 \text{ mA}, P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_{i} = 0.4 \text{ mH}, C_{i} = 6 \text{ nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 \text{ nF}$
• Dust explosion protection for zone 21/22 (pending)	PTB 01 ATEX 2055	
- Marking	Ex II 2 D Ex tb IIIC T120°C Db	
- Connection	To circuits with values: $U_{\rm H}$ = 10.5 45 \ DC; $P_{\rm max}$ = 1.2 \ W	/ To circuits with values: $U_{\rm H}$ = 9 32 V DC; $P_{\rm max}$ = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	'
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	$U_{\rm m} = 45  {\rm V}$	$U_{\rm m} = 32 \text{ V}$
- Connection (Ex ic)	To circuits with values: $U_i = 45 \text{ V}$	FISCO supply unit ic: $U_0 = 17.5 \text{ V}$ , $I_0 = 570 \text{ mA}$ Linear barrier: $U_0 = 32 \text{ V}$ , $I_0 = 132 \text{ mA}$ , $P_0 = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_{\rm i} = 0.4 {\rm mH}, \ C_{\rm i} = 6 {\rm nF}$	$L_{i} = 7 \mu H, C_{i} = 1.1 nF$
• Explosion protection acc. to FM (pending)	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4T6; CL II, DIV T4T6; CL II, DIV CL I, DIV 2, GP ABCD T4T6; CL II, DIV	/ 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC
	32 1, 511 2, GI 71505 1410, OL II, DIV	L, GI I G, OL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

- Explosion protection to CSA (pending)
- Identification (XP/DIP) or (IS)

### Transmitters for applications with advanced requirements (Advanced)

		SITRANS P410 for d	ifferential pressure and flow
HART communication		FOUNDATION Fieldbus	
HART	230 1100 Ω	communication	
Protocol	HART Version 5.x	Function blocks	3 function blocks analog input, 1 function block PID
Software for PC	SIMATIC PDM	<ul> <li>Analog input</li> </ul>	
PROFIBUS PA communication Simultaneous communication with	4	<ul> <li>Adaptation to customer- specific process variables</li> </ul>	Yes, linearly rising or falling characteristic
master class 2 (max.)	·	- Electrical damping, adjustable	0 100 s
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Simulation function	Output/input (can be locked within the device with a bridge)
Cyclic data usage	,	- Failure mode	parameterizable (last good value, substitute value, incorrect
Output byte	5 (one measured value) or 10 (two measured values)	- Limit monitoring	value) Yes, one upper and lower warn-
• Input byte	0, 1, or 2 (register operating mode and reset function for	- Limit monitoring	ing limit and one alarm limit respectively
Internal preprocessing	metering)	<ul> <li>Square-rooted characteristic for flow measurement</li> </ul>	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version	• PID	Standard FOUNDATION Field- bus function block
	3.0, class B	<ul> <li>Physical block</li> </ul>	1 resource block
Function blocks	2	Transducer blocks	1 transducer block Pressure with
Analog input			calibration, 1 transducer block LCD
<ul> <li>Adaptation to customer-specific process variables</li> </ul>	Yes, linearly rising or falling characteristic	Pressure transducer block	
- Electrical damping, adjustable	0 100 s	<ul> <li>Can be calibrated by applying two pressures</li> </ul>	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	<ul> <li>Simulation function: Measured pressure value, sensor temper-</li> </ul>	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warn- ing limit and one alarm limit respectively	ature and electronics tempera- ture	
Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respec- tively		
<ul> <li>Physical block</li> </ul>	1		
To a constitution of the start	0		

Transducer blocks

two pressures

characteristic with - Square-rooted characteristic for flow measurement - Gradual volume suppression

sor temperature

• Pressure transducer block - Can be calibrated by applying

- Monitoring of sensor limits

- Specification of a container

and implementation point of square-root extraction - Simulation function for mea-

sured pressure value and sen-

2

Yes

Yes

Max. 30 nodes

Parameterizable

Constant value or over parame-

terizable ramp function

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering	data	Article No.	Order Code
SITRANS P410 with HAP PN 160 (MAWP 2320 psi	RT pressure transmitters for differential pressure and flow,	7MF4433-	-Z C41
✓ Click on the Article No.	. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	▶ 1	
Measuring span (min	max.)		
2.5 250 mbar	(1.004 100.4 inH <sub>2</sub> O)	▶ D	
6 600 mbar	(2.409 240.9 inH <sub>2</sub> O)	▶ E	
16 1600 mbar	(6.424 642.4 inH <sub>2</sub> O)	▶ F	
50 5000 mbar	(20.08 2008 inH <sub>2</sub> O)	► G	
0.3 30 bar	(4.35 435 psi)	► H	
Wetted parts materials			
stainless steel process fl	anges)		
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	В	
Hastelloy	Hastelloy	C	
Version for diaphragm se	al <sup>1) 2) 3) 4)</sup>	Y	
Process connection			
emale thread 1/4-18 NPT	with flange connection		
Sealing screw opposite	process connection		
- Mounting thread <sup>7</sup> / <sub>16</sub> -2	20 UNF to IEC 61518	<b>2</b>	
	to DIN 19213 (only for replacement requirement)	0	
<ul> <li>Vent on side of process</li> </ul>			
- Mounting thread 7/16-2	20 UNF to IEC 61518	6	
- Mounting thread M10	to DIN 19213 (only for replacement requirement)	4	
Non-wetted parts mater	ials		
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting <sup>6)</sup>	3	
Version			
	nan plate inscription, setting for pressure unit: bar		1
	nglish plate inscription, setting for pressure unit: bar	<b>•</b>	2
,	plate inscription, setting for pressure unit: Pascal	<b>&gt;</b>	3
	vith documentation for SITRANS P in German, English, French, Italian and		
Spanish. Includes Compac	ct operating instructions in 21 EU languages.		
Explosion protection			
None			A
With ATEX, Type of prote	ection:		
- "Intrinsic safety (Ex ia)			В
- "Explosion-proof (Ex d			D
	ameproof enclosure" (Ex ia + Ex d)" <sup>8)</sup>		P
<ul> <li>"Ex nA/ic (Zone 2)"<sup>9)</sup></li> </ul>			E
- "Intrinsic safety, explosi	sion-proof enclosure and dust explosion protection	<b>&gt;</b>	R
(Ex ia+ Ex d + Zone 1			
FM + CSA intrinsic safe	(is) (pending)		F
	x ia + Ex d (ATEX) <sup>10)</sup> (pending)		S
With FM + CSA, Type of			
- Intrinsic Safe and Exp	plosion Proof (is + xp)" <sup>7)</sup> (pending)		NC

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Α	Article No.		Order Code
SITRANS P410 with HART pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)	7	7MF4433-		-Z C41
Electrical connection/cable entry				
Screwed gland Pg 13.5 <sup>11)</sup>			Α	
Screwed gland M20 x 1.5	▶		В	
• Screwed gland ½-14 NPT			С	
• Han 7D plug (plastic housing) incl. mating connector (11)12)			D	
• M12 connectors (stainless steel) <sup>13)14)</sup>			F	
Display			_	
Without display			0	
Without visible display (display concealed, setting: mA)	▶		1	
With visible display (setting: mA)			6	
<ul> <li>with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)</li> </ul>			7	

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

Available ex stock

- Brief instructions (Leporello)
- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443.-.... and 7MF4900-1...-.B
- <sup>4)</sup> The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- 6) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 7) Without cable gland, with blanking plug
- 8) With enclosed cable gland Ex ia and blanking plug
- 9) Configurations with HAN and M12 connectors are only available in Ex ic.
- <sup>10)</sup>Only in connection with IP66.
- <sup>11)</sup>Only in connection with Ex approval A, B or E.
- <sup>12)</sup>Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>
- $^{13)}$ Only in connection with Ex approval A, B, E or F.
- <sup>14)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering	data	Article No.		Order code
Pressure transmitters for	r differential pressure and flow PN 160 (MAWP 2320 psi)			
SITRANS P410 with PROF	TBUS PA (PA)	7MF4434-		-Z C41
SITRANS P410 with FOUN	IDATION Fieldbus (FF)	7MF4435-		-Z C41
✓ Click on the Article No.	for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning			
Silicone oil	normal	1		
Nominal measuring rang	•			
250 mbar (100.4 inH <sub>2</sub> O	•	D		
600 mbar (240.9 inH <sub>2</sub> O 1600 mbar (642.4 inH <sub>2</sub> O	•	E F		
5 bar (2008 inH <sub>2</sub> O)		G		
30 bar (435 psi)		H		
Wetted parts materials				
(stainless steel process fla	anges)			
Seal diaphragm	Parts of measuring cell			
Stainless steel	Stainless steel	A		
Hastelloy	Stainless steel	В		
Hastelloy Version as diaphragm sea	Hastelloy 1, 1) 2) 3) 4)	C		
	<u> </u>			
Process connection Female thread 1/4-18 NPT	with flange connection			
• Sealing screw opposite	•			
- Mounting thread <sup>7</sup> / <sub>16</sub> -2		2		
9	to DIN 19213 (only for replacement requirement)	0		
• Venting on side of proce				
<ul> <li>Mounting thread M10:</li> </ul>	to DIN 19213 (only for replacement requirement)	6		
Non-wetted parts materi				
process flange screws	Electronics housing			
Stainless steel	Die-cast aluminum	2		
Stainless steel	Stainless steel precision casting	3		
Version				
	an plate inscription, setting for pressure unit: bar		1	
	glish plate inscription, setting for pressure unit: bar		2	
, 0	plate inscription, setting for pressure unit: Pascal		3	
	rith documentation for SITRANS P in German, English, French, Italian and ct operating instructions in 21 EU languages.			
Explosion protection	t operating included in 2 i 20 tailigaages.	-		
None			Α	
• With ATEX, Type of prote	ection:			
- "Intrinsic safety (Ex ia)			В	
- "Explosion-proof (Ex d			D	
<ul> <li>"Intrinsic safety and flate"</li> <li>"Ex nA/ic (Zone 2)" 8)</li> </ul>	ameproof enclosure" (Ex ia + Ex d)" <sup>7)</sup>		P	
	sion-proof enclosure and dust explosion protection		E R	
(Ex ia + Ex d + Zone 1	sion-proof enclosure and dust explosion protection D/2D)** <sup>7) 9)</sup> (not for DS III FF) (pending)		"	
• FM + CSA intrinsic safe	(is) (pending)		F	
	x ia + Ex d (ATEX) <sup>9)</sup> (pending)		S	
With FM + CSA, Type of     "Intrinsic Safe and Eye	protection: plosion Proof (is + xp) <sup>n8)</sup> (pending)			
- munisic safe and Exp	prosion Froot (is + xp) -/ (penaing)		NC	
Electrical connection/ca	·			
<ul> <li>Screwed gland M20 x 1</li> </ul>			В	
<ul><li>Screwed gland ½-14 NF</li><li>M12 connectors (stainle</li></ul>			C F	
• IVITZ CONNECTORS (Stainle	200 SICCI) . ,			

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Article No.	Order code
Pressure transmitters for differential pressure and flow PN 160 (MAWP 2320 psi)		
SITRANS P410 with PROFIBUS PA (PA)	7MF4434-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)	7MF4435-	-Z C41
Display		
Without display		0
Without visible display (display concealed, setting: bar)		1
With visible display (setting: bar)		6
<ul> <li>With customer-specific display (setting as specified, Order code "Y21" required)</li> </ul>		7

- Included in delivery of the device:

   Brief instructions (Leporello)

   DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included wiht the transmitter order number, for example 7MF443.-..Y..-... and 7MF4900-1...-.B
- $^{4)}$  The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- 6) Without cable gland, with blanking plug.
- 7) With enclosed cable gland Ex ia and blanking plug.
- $^{8)}\,$  Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- $^{10)}$ Only in connection with Ex approval A, B, E or F.
- <sup>11)</sup>M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering data	Order	code		
Further designs Add "-2" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:  • Steel • Stainless steel	A01 A02	<b>V</b>	<b>√</b>	<i>4</i>
O-rings for process flanges (instead of FPM (Viton))  • PTFE (Teflon)  • FEP (with silicone core, approved for food)  • FFPM (Kalrez, compound 4079), for measured medium temperatures  -15 100 °C (5 212 °F)	A20 A21 A22	* * * *	*	* * * *
<ul> <li>NBR (Buna N)</li> <li>plug</li> <li>Han 7D (metal)</li> <li>Han 8D (instead of Han 7D)</li> <li>Angled</li> <li>Han 8D (metal)</li> <li>Sealing screws (2 units)</li> </ul>	A30 A31 A32 A33 A40	* * * * * * * * * * * * * * * * * * * *	✓ ✓	✓
1/4-18 NPT, with valve in mat. of process flanges  Cable sockets for M12 connectors (metal (CuZn))	A50	·	·	·
Rating plate inscription (instead of German) • English • French • Spanish • Italian  English rating plate Pressure units in inH <sub>2</sub> O and/or psi	B11 B12 B13 B14 B21	* * * * * * * * * * * * * * * * * * *		* * * * * * * * *
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2 <sup>1)</sup>	C11	<b>√</b>	✓	✓
Inspection certificate <sup>2)</sup> to EN 10204-3.1  Factory certificate to EN 10204-2.2  Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C12 C14 C20	* * *	✓ ✓	<b>✓</b>
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	<b>√</b>		
Increased measuring accuracy (mandatory specification for SITRANS P410)  Device passport Russia	C41	<b>✓</b>	√ √	✓
· ·				

Selection and Ordering data  Further designs Add "-Z" to Article No. and specify Order code.	Order	HART	PA	FF
Add "-Z" to Article No. and specify Order		HART	PA	66
code.				FF
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	✓
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
TAG plate empty (no inscription)	D61	✓	✓	✓
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4B Ex ia)"and IP66)	E01	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>3)</sup>	✓	✓	✓
(only for transmitter 7MF4B)				
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4D)	E56 <sup>3)</sup>	1	✓	✓
Explosion-proof "Zone 2" to NEPSI (China)	E57 <sup>3)</sup>	1	✓	✓
(only for transmitter 7MF4				
Ex protection "Ex ia", "Ex d" and "Zone 2" to NEPSI (China)  (only for transmitter 7MF4R)	E58 <sup>3)</sup>	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (pending)	E70 <sup>3)</sup>	1	✓	✓
(only for transmitter 7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>4)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>4)</sup>	1	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	1	✓	✓
Interchanging of process connection side	H01	✓	✓	✓
Vent on side for gas measurements	H02	✓	✓	✓
Stainless steel process flanges for verti- cal differential pressure lines (not together with K01, K02 and K04) <sup>5)</sup>	H03	✓	1	1

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Order	code		
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FI
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	<b>*</b>
Chambered PTFE graphite gasket	J03	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	•
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>6)</sup>	J08	✓	✓	<b>√</b>
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>6)</sup>	J09	✓	✓	<b>V</b>

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/193).

#### ✓ = available

- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) Option does not include ATEX approval, but instead includes only the country-specific approval.
- 4) Approval pending.
- 5) Not suitable for connection of remote seal.
- 6) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Selection and Ordering data Order code				
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF	
Measuring range to be set  Specify in plain text:  • in the case of linear characteristic curve (max. 5 characters):  Y01: up to mbar, bar, kPa, MPa, psi  • in the case of square rooted characteristic (max. 5 characters):  Y02: up to mbar, bar, kPa, MPa, psi		✓	<b>√</b> 1)		
Stainless steel tag plate and entry in device variable (measuring point description)  Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓	
Measuring point text (entry in device variable)  Max. 27 char., specify in plain text: Y16:	Y16	✓	✓	✓	
Entry of HART address (TAG)  Max. 8 char., specify in plain text: Y17:	Y17	✓			
Setting of pressure indicator in pressure units  Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi,  Note: The following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O*, inH <sub>2</sub> O*, ftH <sub>2</sub> O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or %  *) ref. temperature 20 °C	Y21	•	<b>√</b>	✓	
Setting of pressure indicator in non-pressure units <sup>2</sup> ) Specify in plain text: Y22: up to //min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y22 <sup>3)</sup> + Y01 or Y02				
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		1	✓	
Damping adjustment in seconds (0 100 s)	Y30	1	1	✓	

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

<sup>✓ =</sup> available

<sup>1)</sup> Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

<sup>2)</sup> Preset values can only be changed over SIMATIC PDM.

<sup>3)</sup> Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Transmitters for applications with advanced requirements (Advanced)

Selection and Orderin	ng data	Article No.			Order code
SITRANS P DS III with PN 420 (MAWP 6092	h HART pressure transmitters for differential pressure and flow, psi)	7MF4533-			-Z C41
✓ Click on the Article	No. for the online configuration in the PIA Life Cycle Portal.				
Measuring cell filling	Measuring cell cleaning				
Silicone oil	normal	1			
Measuring span (min	max.)	_			
2.5 250 mbar	(1 100 inH <sub>2</sub> O)	D			
6 600 mbar	(2.4 240 inH <sub>2</sub> O)	E			
16 1600 mbar	(6.4 642 inH <sub>2</sub> O)	F			
50 5000 mbar	(20 2000 inH <sub>2</sub> O)	G H			
0.3 30 bar	(4.35 435 psi)				
Wetted parts materia					
(stainless steel proces Seal diaphragm	Parts of measuring cell				
Stainless steel Hastelloy	Stainless steel Stainless steel	A B			
Version for diaphragm		Y			
Process connection		_			
	PT with flange connection				
	site process connection				
	<sub>16</sub> -20 UNF to IEC 61518		3		
- Mounting thread M	12 to DIN 19213 (only for replacement requirement)		1		
	ocess flanges, location of vent valve at top of process flanges				
(see dimensional dra	wing) <sub>16</sub> -20 UNF to IEC 61518	-	,		
	12 to DIN 19213 (only for replacement requirement)				
		_			
Non-wetted parts ma process flange screws					
Stainless steel	Die-cast aluminum		2		
Stainless steel	Stainless steel precision casting <sup>5)</sup>		3		
Version	Granicos steel producting	_			
	erman plate inscription, setting for pressure unit: bar		1		
	English plate inscription, setting for pressure unit: bar		2		
	lish plate inscription, setting for pressure unit: Pascal		3		
	D with documentation for SITRANS P in German, English, French, Italian and Spa-				
nish. Includes Compac	t operating instructions in 21 EU languages.				
Explosion protection					
<ul><li>None</li></ul>			Α		
<ul> <li>With ATEX, Type of p</li> </ul>					
- "Intrinsic safety (Ex			В		
- "Explosion-proof (E			D		
- "Intrinsic safety and	d flameproof enclosure" (Ex ia + Ex d)" <sup>7)</sup>		P		
- "Ex nA/ic (Zone 2)"			E		
- Intrinsic safety, exp	olosion-proof enclosure and dust explosion protection e 1D/2D) <sup>r7)9)</sup> (pending)		R		
• FM + CSA intrinsic s			F		
	+ Ex ia + Ex d (ATEX) <sup>9)</sup> (pending)		s		
• With FM + CSA, Type	e of protection:				
	d explosion-proof (is + xp)" 6), max PN 360 (pending)		N	С	
Electrical connection	/cable entry		L.		
<ul> <li>Screwed gland Pg 1:</li> </ul>				Α	
<ul> <li>Screwed gland M20x</li> </ul>				В	
<ul> <li>Screwed gland ½-14</li> </ul>				C	
<ul> <li>Han 7D plug (plastic</li> </ul>	housing) incl. mating connector 10)11)			D	
<ul> <li>M12 connectors (sta</li> </ul>	inless steel) <sup>12)13)</sup>			F	

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Article No.	Order code
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	7MF4533-	-Z C41
Display		
Without display		0
Without visible display (display concealed, setting: mA)		1
With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Power supply units see Chap. 7 "Supplementary Components".

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453.-.Y..-.... and 7MF4900-1....-.B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- $^{8)}$  Configurations with HAN and M12 connectors are only available in Ex ic.
- 9) Only in connection with IP66.
- <sup>10)</sup>Only in connection with Ex approval A, B or E.
- <sup>11)</sup>Permissible only for crimp-contact of conductor cross-section 1 mm<sup>2</sup>
- <sup>12)</sup>Only in connection with Ex approval A, B, E or F.
- <sup>13)</sup>M12 delivered without cable socket.

Transmitters for applications with advanced requirements (Advanced)

Selection and Ordering	data	Article No.	Order Code
Pressure transmitters f	or differential pressure and flow, PN 420 (MAWP 6092 psi)		
SITRANS P410 with PRO	FIBUS PA (PA)	7MF4534-	-Z C41
SITRANS P410 with FOU	NDATION Fieldbus (FF)	7MF4535-	-Z C41
	o. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling Silicone oil	Measuring cell cleaning normal	1	
Nominal measuring ran	nge	-	
250 mbar	(100 inH <sub>2</sub> O)	D	
600 mbar	(240 inH <sub>2</sub> O)	E	
1600 mbar	(642 inH <sub>2</sub> O)	F	
5 bar 30 bar	(2000 inH <sub>2</sub> O) (435 psi)	G H	
Wetted parts materials	(Too por)	- " "	
(stainless steel process t	ilanges)		
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy Version for diaphragm se	Stainless steel	B	
Process connection	,		
Female thread 1/4-18 NPT	with flange connection		
• Sealing screw opposite			
- Mounting thread <sup>7</sup> / <sub>16</sub> -		3	
	to DIN 19213 (only for replacement requirement)	1	
<ul> <li>venting on side of prod (see dimensional draw</li> </ul>	ress flanges, location of vent valve at top of process flanges		
- Mounting thread <sup>7</sup> / <sub>16</sub> -	9). 20 UNF to IEC 61518	7	
	to DIN 19213 (only for replacement requirement)	5	
Non-wetted parts mate	rials		
Process flange screws	Electronics housing		
Stainless steel Stainless steel	Die-cast aluminum Stainless steel precision casting	2 3	
Version	Stainless steel precision casting	_	
	nan plate inscription, setting for pressure unit: bar	1	
	nglish plate inscription, setting for pressure unit: bar	2	
Chinese version, Englis	h plate inscription, setting for pressure unit: Pascal	3	
	with documentation for SITRANS P in German, English, French, Italian and Spa- perating instructions in 21 EU languages.		
Explosion protection	. 5	-	
• None		A	
With ATEX, Type of pro			
- "Intrinsic safety (Ex ia		В	
- "Explosion-proof (Ex	d)" <sup>()</sup>  ameproof enclosure" (Ex ia + Ex d)" <sup>(6)</sup>	D P	
- "Ex nA/ic (Zone 2)" 7)		E	
	osion-proof enclosure and dust explosion protection	R	
	osion-proof enclosure and dust explosion protection 1D/2D) <sup>*6)8)</sup> (not for P410 with FOUNDATION Fieldbus) (pending)		
• FM + CSA intrinsic safe		F	
	Ex ia + Ex d (ATEX) <sup>7)</sup> (pending)	S	
<ul> <li>With FM + CSA, Type of a superior s</li></ul>	or protection: explosion-proof (is + xp) <sup>#6)</sup> , max PN 360 (pending)	NC	
Electrical connection/c			
Screwed gland M20 x	•	В	
• Screwed gland 1/2-14 N	PT	C	
<ul> <li>M12 connectors (stain)</li> </ul>	ess steel) <sup>9) 10)</sup>	F	

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Article No.	Order Code
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		
SITRANS P410 with PROFIBUS PA (PA)	7MF4534-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)	7MF4535-	-Z C41
	1====	
Display		
Without (display hidden)		0
<ul> <li>Without visible display (display concealed, setting: bar)</li> </ul>		1
With visible display (setting: bar)		6
<ul> <li>With customer-specific display (setting as specified, Order code "Y21" required)</li> </ul>		7

Included in delivery of the device:
• Brief instructions (Leporello)

- DVD with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the tranmitter order number, for example 7MF453.-.Y..-... and 7MF4900-1....-.B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Without cable gland, with blanking plug.
- 6) With enclosed cable gland Ex ia and blanking plug.
- $^{7)}$  Configurations with HAN and M12 connectors are only available in Ex ic.
- 8) Only in connection with IP66.
- 9) Only in connection with Ex approval A, B, E or F.
- 10) M12 delivered without cable socket

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Order	code		
Further designs	Oradi	HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Pressure transmitter with mounting				
bracket (1x fixing angle, 2 x nut, 2 x U- washer or 1 x bracket, 2 x nut, 2 x U- washer) made of:			,	
Steel     Stainless steel	A01 A02	<b>√</b>	<b>*</b>	<b>V</b>
O-rings for process flanges (instead of FPM (Viton))	AUZ	·	·	·
PTFE (Teflon)	A20	1	1	✓
<ul><li>FEP (with silicone core, approved for food)</li><li>FFPM (Kalrez, compound 4079),</li></ul>	A21 A22	<b>√</b>	<b>√</b>	<b>✓</b>
for measured medium temperatures -15 100 °C (5 212 °F) • NBR (Buna N)	A23	<b>√</b>	<b>√</b>	1
Plug	7120			
• Han 7D (metal)	A30	✓		
Han 8D (instead of Han 7D)	A31	✓		
• Angled	A32	<b>V</b>		
Han 8D (metal)	A33	<b>V</b>		
<b>Sealing screws (2 units)</b> 1/4-18 NPT, with valve in mat. of process flanges	A40	<b>√</b>	<b>✓</b>	~
Cable sockets for M12 connection (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)			رة.	
• English	B11	<b>√</b>	<b>√</b>	1
<ul><li>French</li><li>Spanish</li></ul>	B12 B13	<b>✓</b>	<b>v</b>	<b>✓</b>
• Italian	B14	1	1	1
English rating plate Pressure units in inH <sub>2</sub> O and/or psi	B21	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	✓	<b>✓</b>	<b>✓</b>
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL con- formity declaration	C23	✓		
Increased measuring accuracy (mandatory specification for SITRANS P410)	C41	✓	✓	✓
Device passport Russia	C99	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)  (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
TAG plate empty (no inscription)	D61	✓	✓	✓

Selection and Ordering data	Order	code		
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Use in or on zone 1D/2D	E01	✓	✓	✓
(only together with type of protection				
"Intrinsic safety" (transmitter 7MF4B Ex ia) "and IP66)				
Dual seal	E24	1	1	1
Explosion-proof "Intrinsic safety" to NEPSI (China)	E55 <sup>1)</sup>	✓	✓	✓
(only for transmitter 7MF4				
Ex prot. "Explosion-proof" to NEPSI (China)	E56 <sup>1)</sup>	✓	✓	✓
(only for transmitter 7MF4D)				
<b>Explosion-proof "Zone 2" to NEPSI (China)</b> (only for transmitter 7MF4E)	E57 <sup>1)</sup>	✓	✓	✓
Ex protection "Ex ia", "Ex d" and "Zone 2"	E58 <sup>1)</sup>	✓	✓	✓
to NEPSI (China) (only for transmitter 7MF4R)				
"Intrinsic safety" and "Explosion-proof"	E70 <sup>1)</sup>	1	✓	✓
explosion protection acc. to Kosha (Korea)				
(pending) (only for transmitter				
7MF4[B, D]Z + E11)				
Ex-protection Ex ia according to EAC Ex (Russia)	E80 <sup>2)</sup>	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81 <sup>2)</sup>	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82 <sup>2)</sup>	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83 <sup>2)</sup>	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Interchanging of process connection side	H01	✓	✓	1
Vent on side for gas measurements	H02	✓	✓	1
Stainless steel process flanges for vertical differential pressure lines	H03	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	1	✓	✓
Chambered graphite gasket for process flange	J02	1	✓	✓
Chambered PTFE graphite gasket	J03	1	1	1
EPDM O-rings for process flange with	J05	1	1	1
approval (WRC/WRAS)				
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display) <sup>3)</sup>	J08	1	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display) <sup>3)</sup>	J09	✓	1	✓

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/193).

<sup>1)</sup> Option does not include ATEX approval, but instead includes only the country-specific approval.

<sup>2</sup> Outlity-specific approval.
2) Approval pending.
3) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

Selection and Ordering data	Order	code		
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set				
Specify in plain text:  • in the case of linear characteristic curve (max. 5 characters):	Y01	1	<b>√</b> 1)	
Y01: up to mbar, bar, kPa, MPa, psi • in the case of square rooted characteristic (max. 5 characters):	Y02	<b>✓</b>		
Y02: up to mbar, bar, kPa, MPa, psi				
Stainless steel tag plate and entry in device variable (measuring point descrip-	Y15	✓	✓	✓
tion) Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device vari-	Y16	✓	✓	✓
able) Max. 27 char., specify in plain text: Y16:				
Entry of HART address (TAG)	Y17	1		
Max. 8 char., specify in plain text: Y17:				
Setting of pressure indication in pressure	Y21	✓	✓	✓
units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi,				
Note: The following pressure units can be selected: bar, mbar, mm H <sub>2</sub> O <sup>*</sup> ), inH <sub>2</sub> O <sup>*</sup> ), ftH <sub>2</sub> O <sup>*</sup> ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Torr, ATM or % *) ref. temperature 20 °C				
Setting of pressure indication in	Y22 +	✓		
non-pressure units <sup>2)</sup> Specify in plain text: Y22: up to I/min, m <sup>3</sup> /h, m, USgpm, (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y01 or Y02			
Preset bus address	Y25		✓	✓
possible between 1 and 126 Specify in plain text: Y25:				
Damping adjustment in seconds (0 100 s)	Y30	✓	✓	1

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

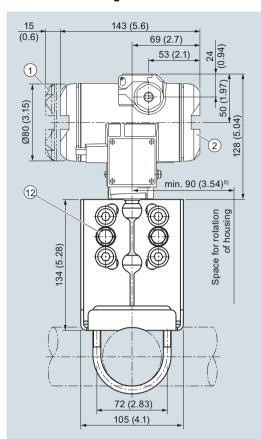
<sup>✓ =</sup> available

Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
 Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow

### Dimensional drawings



- 1 Electronic side, digital display (longer overall length for cover with window)<sup>1)</sup>
- 2 Terminal side<sup>1)</sup>
- 3 Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)<sup>2)3)</sup>, Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2)3)</sup> plug
- 4 Harting adapter
- 5 Protective cover over keys

approx. 96 (3.78)

17 (0.67)

3 4

68 (2.7)

120 (4.7)

84 (3.31)

(6)

(8)

(9)

166 (6.54)

96 (3.8)

262 (10.3)

29

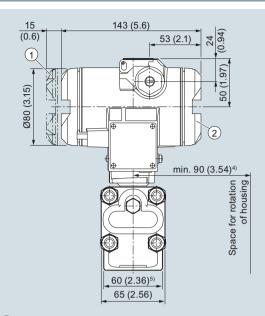
(3)

- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Lateral venting for liquid measurement (Standard)
- 9 Lateral venting for gas measurement (suffix H02)
- 10 Mounting bracket (option)
- 11 Sealing screw with valve (option)
- 12 Process connection: 1/4-18 NPT (IEC 61518)
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- Not with type of protection "Explosion-proof enclosure"
   Not with type of protection "FM + CSA" [IS + XP]"
- 4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
- <sup>5)</sup> 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P410 pressure transmitters for differential pressure and flow, dimensions in mm (inch)

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 for differential pressure and flow



- approx. 96 (3.78) 17 (0.67) 29 (1.14)<sup>6)</sup> 84 (3.31) 6 (6) (7) (82) (1.14)<sup>6)</sup> 84 (3.31) 9 (1.14)<sup>6</sup> 84 (3.31) 9 (1.14)<sup>6</sup> 84 (3.31) (1.14)<sup>6</sup> 84 (
- Electronic side, digital display
   (longer overall length for cover with window)¹¹)
- 2 Terminal side1)
- (3) Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)<sup>2) 3)</sup>, Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D<sup>2) 3)</sup> plug
- 4 Harting adapter
- 1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- 2) Not with type of protection "Explosion-proof enclosure"
- 3) Not with type of protection "FM + CSA" [IS + XP]"
- <sup>4)</sup> 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
- 5) 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 6) 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- 7) 219 mm (8.62 inch) for PN  $\geq$  420 (MAWP  $\geq$  6092 psi)
- 8) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

- 5 Protective cover over keys
- 6 Blanking plug
- Screw cover safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- 8 Sealing screw with valve (option)
- 9 Process connection: 1/4-18 NPT (IEC 61518)

SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Accessories/Spare parts

Selection and Ordering data	Article No.
Accessories/Spare parts	
Mounting bracket and fastening parts	
for pressure transmitters	
SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus (7MF403C.)	
• made of steel	7MF4997-1AB
made of stainless steel	7MF4997-1AH
Mounting bracket and fastening parts	
for pressure transmitters SITRANS P410 with HART, P410 with	
PROFIBUS PA and P10with FOUNDATION	
Fieldbus (7MF403A.,B.,D. andF.)	
made of steel	7MF4997-1AC
made of stainless steel	7MF4997-1AJ
Mounting and fastening brackets	
For differential pressure transmitters with	
flange thread M10 SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus (7MF443)	
• made of steel	7MF4997-1AD
made of stainless steel	7MF4997-1AK
Mounting and fastening brackets	
For differential pressure transmitters with flange thread M12	
SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus (7MF453)	
• made of steel	7MF4997-1AE
made of stainless steel	7MF4997-1AL
Mounting and fastening brackets	
For differential pressure transmitters with flange thread 7/16 -20 UNF	
SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus (7MF443 and 7MF453)	
made of steel     made of stainless steel	7MF4997-1AF 7MF4997-1AM
	/WIF455/-TAW
Cover	
made of die-cast aluminum, including gasket, for SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus	
without window	7MF4997-1BB
• with window	7MF4997-1BE
Cover	
made of stainless steel, including gasket, or SITRANS P410 with HART, P410 with	
PROFIBUS PA and P410 with FOUNDATION	
Fieldbus	
• without window	7MF4997-1BC
• with window	7MF4997-1BF
Digital indicator	7MF4997-1BR
Including mounting material, for SITRANS P410 with HART, P410 with PROFIBUS PA and	
P410 with FOUNDATION Fieldbus	
Measuring point label	
without inscription (5 units)	7MF4997-1CA
• Printed (1 unit)	7MF4997-1CB-Z
Data according to Y01 or Y02, Y15, Y16 and	Y:
Y99 (see "Pressure transmitters")	

Selection and Ordering data	Article No.
Mounting screws  For measuring point label, grounding and con-	7MF4997-1CD
nection terminals or for display (50 units)	
Sealing screws (1 set = 2 units) for process flange	
<ul> <li>made of stainless steel</li> </ul>	7MF4997-1CG
made of Hastelloy	7MF4997-1CH
Sealing screws with vent valve Complete (1 set = 2 units)	
• made of stainless steel	7MF4997-1CP
made of Hastelloy	7MF4997-1CQ
Connection board	
• for SITRANS P410	7MF4997-1DN
<ul> <li>for SITRANS P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus</li> </ul>	7MF4997-1DP
O-rings for process flanges made of:	
• FPM (Viton)	7MF4997-2DA 7MF4997-2DB
<ul><li>PTFE (Teflon)</li><li>FEP (with silicone core, approved for food)</li></ul>	7MF4997-2DB 7MF4997-2DC
• FFPM (Kalrez, compound 4079)	7MF4997-2DC 7MF4997-2DD
NBR (Buna N)	7MF4997-2DE
Sealing ring for process connection	
Sealing fing for process connection	see "Fittings"

Available ex stock

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410 - Accessories/Spare parts

Selection and Ordering data	Article No.
Operating Instructions <sup>1)</sup>	7 11 11 01 0 1 40 .
• for SITRANS P DS III/P410 with HART	
- German	A5E00047090
- English	A5E00047092
- French	A5E00053218
- Spanish	A5E00053219
- Italian	A5E00053220
- Chinese	A5E33328988
• for SITRANS P DS III/P410 with PROFIBUS F	ΡΔ
- German	A5E00053275
- English	A5E00053276
- French	A5E00053277
- Spanish	A5E00053278
- Italian	A5E00053279
- Chinese	A5E35875441
<ul> <li>for SITRANS P DS III/P410 with</li> </ul>	
FOUNDATION Fieldbus	A-F-00070000
- German	A5E00279629
- English - French	A5E00279627 A5E00279630
- French - Spanish	A5E00279630 A5E00279632
- Italian	A5E00279631
Compact operating instructions	
SITRANS P DS III/P410	
<ul> <li>English, German, Spanish, French, Italian, Dutch</li> </ul>	A5E03434626
<ul> <li>English, Estonian, Latvian, Lithuanian, Polisl Romanian, Croatian</li> </ul>	h, <b>A5E03434631</b>
<ul> <li>English, Bulgarian, Czech, Finnish, Slovakian, Slovenian</li> </ul>	A5E03434645
<ul> <li>English, Danish, Greek, Portuguese, Swedish, Hungarian</li> </ul>	A5E03434656
<ul> <li>Korean, Portuguese for Brasil, Russian</li> </ul>	A5E03693760
The compact operating instructions are avail	-
able in 21 EU languages on the product CD supplied with each transmitter. They can also	
be downloaded from the SITRANS P web	,
page.	
Brief instruction (Leporello)	
• for SITRANS P DS III/P410 with HART	
- German, English, French, Italian, Spanish	A5E32868055
Portuguese, Chinese	24
<ul> <li>for SITRANS P DS III/P410 with PROFIBUS F</li> <li>German, English, French, Italian, Spanish</li> </ul>	
Portuguese, Chinese	, A5E32868548
• for SITRANS P DS III/P410 with FOUNDATIO	N
Fieldbus	
- German, English, French, Italian, Spanish	A5E33295708
Portuguese, Chinese	
DVD with SITRANS P documentation	A5E00090345
German, English, French, Spanish, Italian	
incl. compact operating instructions in 21 EU languages	
Certificates (order only via SAP)	
instead of Internet download	
<ul> <li>hard copy (to order)</li> </ul>	A5E03252406
on DVD (to order)	A5E03252407
HART modem	

Available ex stock

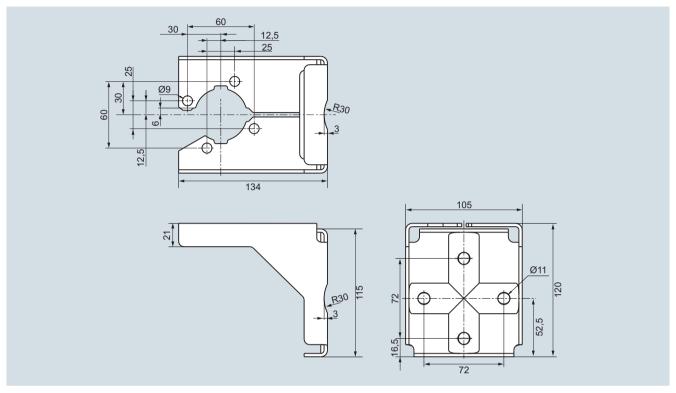
Power supply units see Chap. 7 "Supplementary Components".

You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

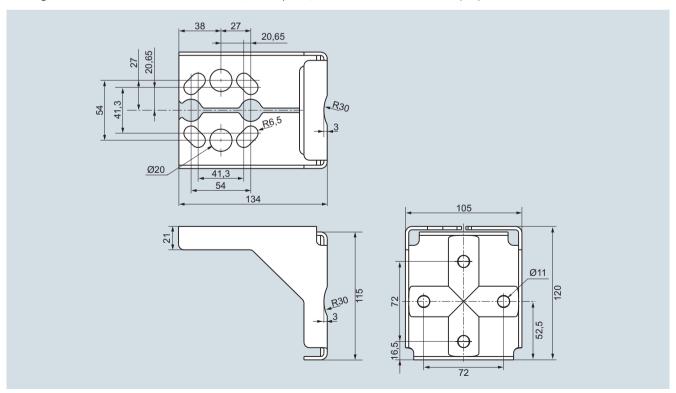
Transmitters for applications with advanced requirements (Advanced)

### SITRANS P410 - Accessories/Spare parts

### Dimensional drawings



Mounting bracket for SITRANS P410 gauge pressure-transmitters, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P410 differential pressure transmitter, dimensions in mm mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Technical description

#### Overview



SITRANS P500 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and which fulfil the most stringent demands of accuracy, long-term stability, speed and lots more.

Extensive functionality allows you to set the pressure transmitter specifically to your own requirements. Despite their many settings options, local set-up is easy. A multi-lingual menu with clear text instructions guides you through the process. There are also help texts available.

The innovative EDD with integrated QuickStart assistance is also quick and easy to configure by computer using the HART protocol

Extensive diagnostic functions, e.g. min/max pointer for pressure and temperature, or limit value indicator, make sure you always have the process under control. You can also display additional process values such as temperature or static pressure. The simultaneous display of mass, resulting from a volume, is also easy.

The SITRANS P500 pressure transmitters can be configured to measure:

- Differential pressure
- Level
- Volume
- Mass
- Volume flow
- Mass flow

### Benefits

- · High measuring accuracy
- · Very fast response time
- · Extremely good long-term stability
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions which can be used both on site as well as via HART.
- Optional separate replacement of measuring cell and electronics without recalibration.
- · Extremely low conformity error values

- Infinitely adjustable spans of 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH<sub>2</sub>O)
- Extremely good total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Parameterization via on-site control keys or HART
- Short process flanges nable space-saving installation.

#### Application

The SITRANS P500 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with ratings "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitter comes with a CE-declaration of conformity and fulfils the corresponding unified European directives (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

With newly designed measuring cell, it is possible to work with process temperatures of -40 to 125 °C (-40 to +257 °F)) without having to use a remote seal.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous fluids.

The pressure transmitter can be fully parameterized locally via the three operating keys and externally via HART.

Transmitters for applications with highest requirements (Premium)

#### SITRANS P500 - Technical description

### Pressure transmitters for differential pressure and flow

- Measured variables:
  - Differential pressure
  - Small positive or negative pressure
  - Flow  $\dot{q} \sim \sqrt{\Delta p}$  (together with a primary element (see Chapter "Flow Meters"))
- Span (freely adjustable) for SITRANS P500: 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH<sub>2</sub>O)

#### Pressure transmitters for level

- · Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (freely adjustable) for SITRANS P500: 1.25 to 6250 mbar (0.5 to 2509 in H2O)

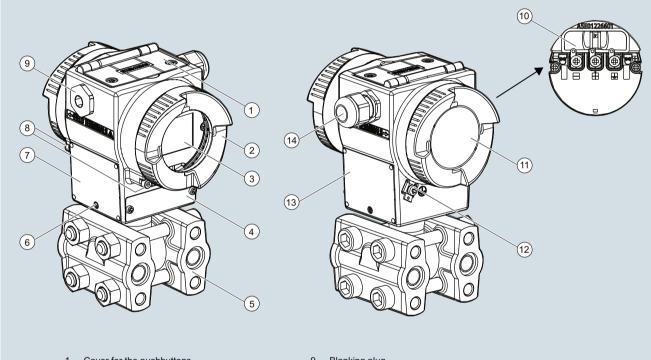
- Nominal diameter of the mounting flange
- DN 50 / PN 40
- DN 80 / PN 40
- DN 100/ PN 16, PN 40
- 2 inch/class 150. class 300
- 3 inch/class 150, class 300
- 4 inch/ class 150, class 300
- customized special version

In the case of level measurements in open vessels, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric")

In the case of measurements in closed vessels, the lower-pressure connection has to be connected to the vessel in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

#### Design



- Cover for the pushbuttons
- Cover, optionally with window
- Display (optional) 3
- 4 TAG plate
- Process flange with process connection
- Lock screws (on two sides) for the measuring cell
- Approval plate
- Safety catch

- Blanking plug
- Terminal compartment 10
- Cover for terminal compartment 11
- PE/ground terminal 12
- 13 Nameplate
- Cable inlet, optionally with cable gland or plug-in connection

#### View of transmitter

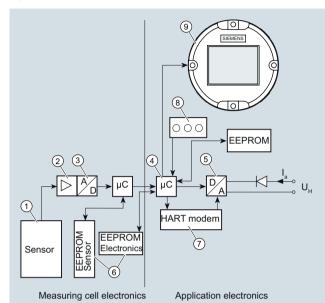
- The electronics housing is made of coated die-cast aluminum.
- The casing has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional display through the window.
- The inlet to the terminal compartment is located either on the left or right side. The unused opening in each case is sealed by a blanking plug.
- The PE/ground terminal is on the back of the housing.
- · Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic housing is the measuring cell with its process flanges at which the process connections are available. The modular design of the pressure transmitter lets you replace the measuring cell, electronics and connection board as required.
- On the top of the housing you can see the screwed cover of the three local pushbuttons of the transmitter.

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Technical description

### Function

#### Operation of electronics with HART communication



- Sensor of the measuring cell
- 2 Measuring amplifier
- 3 Analog-to-digital converter
- 4 Microcontroller
- 5 Digital-to-analog converter
- 6 One EEPROM each in the measuring cell and in the electronics
- ' HART modem
- 8 Keys (local operation)
- 9 Digital display
- I. Output current
- Û<sub>⊢</sub> Auxiliary power

#### Function diagram of electronics

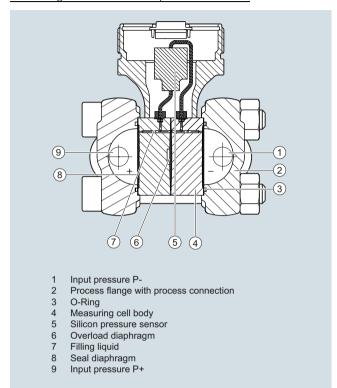
- The input pressure is converted into an electrical signal by the sensor.
- This signal is amplified by the measuring amplifier and digitalized in an analog-to-digital converter.
- The digital signal is analyzed in a microcontroller and corrected according to linearity and thermal characteristics.
- In a digital-to-analog converter it is then converted into the output current of 4 to 20 mA. When connected to supply lines, a diode circuit provides reverse polarity protection.
- The measuring cell-specific data, the electronic data and the parameterization data is held in two EEPROMs. One EEPROM is incorporated into the measuring cell electronics, the other is incorporated into the application electronics.

#### Operation

- The three local pushbuttons enable you both to navigate and carry out configuration and to visually track messages and process values, provided a display is available.
- If you have a device without a display, you can carry out zero adjustment using the three local pushbuttons. It is possible to retrofit a display at any time.
- You can also carry out settings by computer via a HART modem.

### Mode of operation of the measuring cells

Measuring cell for differential pressure and flow



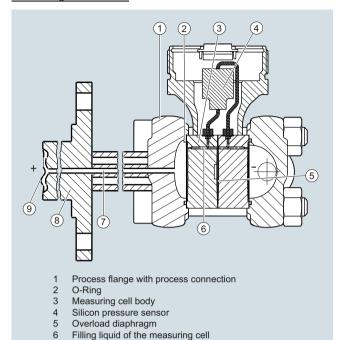
Measuring cell for differential pressure and flow, function diagram

- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters for applications with highest requirements (Premium)

#### SITRANS P500 - Technical description

#### Measuring cell for level



Measuring cell for level, function diagram

Flange with optional tube

Seal diaphragm for mounting flange

 The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange

Capillary tube with filling liquid of the mounting flange

- The differential pressure applied to the measuring cell is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a differential pressure proportional to the input pressure.

#### Configuration of SITRANS P500 HART

Depending on the version, there are a range of options for configuring the pressure transmitter and for setting or reading the parameters.

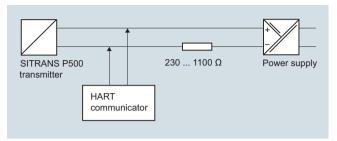
#### Configuration using the pushbuttons (local operation)

You can configure the transmitter in situ using the three keys provided a display is available. If you have no display, you can only carry out zero adjustment.

It is possible to retrofit a display. See accessories.

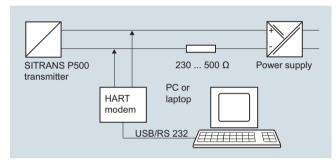
### Configuration using HART

Parameterization using HART is carried out using a HART Communicator or a PC in conjunction with a HART modem.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

For configuring via PC a HART modem is used which connects the transmitter to the PC.

The signals needed for communication in conformity with the HART 6.0 protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

The necessary device files are available for download on the Internet.

#### SITRANS P500 configuration options

The transmission offers you full configuring options both via HART as well as in situ provided the optional display is available.

For simple parameterizing we also offer the easy to understand QuickStart function with quided commissioning.

### SITRANS P500 diagnostic functions

- Maintenance timer
- Min/Max pointer (both resetable and non-resetable)
  - Pressure (incl. time and temperature stamp)
  - Static pressure (incl. time and temperature stamp)
  - Sensor temperature (incl. time stamp)
  - Electronic temperature (incl. time stamp)
- Limit monitor block
- Diagnostic warning
- Diagnostic alarm
- · Simulation functions
- · Display of trends and histograms
- · Operating hours meter

Transmitters for applications with highest requirements (Premium)

SITRANS P500 - Technical description

# Physical dimensions available for the SITRANS P500 HART display

Physical dimensions
Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², mm $H_2O$ (4 °C), in $H_2O$ (4 °C), in $H_2O$ (20 °C), mm $H_2O$ , mm $H_2O$ (4 °C), ft $H_2O$ (20 °C), in $H_3$ , mm $H_3$ , hPA
m, cm, mm, ft, in
m <sup>3</sup> , dm <sup>3</sup> , hl, yd <sup>3</sup> , ft <sup>3</sup> , in <sup>3</sup> , gallon, Imp. gallon, bushel, barrel, barrel liquid, I; Norm (standard) I; Norm (standard) m <sup>3</sup> , Norm (standard) feet <sup>3</sup>
g, kg, t (metric), lb, Ston, Lton, oz
m³/d, m³/h, m³/s, l/min, l/s, ft³/d, ft³/min, ft³/s, US gallon/min, gallon/s, l/h, milL/d, gallon/d, gallon/h, milgallon/d, Imp.gallon/s, Imp.gallon/m, Imp.gallon/h, lmp.gallon/h, Norm (standard) m³/h, Norm (standard) l/h, Norm (standard) ft³/h, Norm (standard) ft³/m, barrel liquid/s, barrel liquid/m, barrel liquid/h
t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/h, g/min, g/s, lb/d, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
K, °C, °F, °R
%, mA

Transmitters for applications with highest requirements (Premium)

Technical	specifications
lecillicai	Specifications

Input			Measuring accuracy		
Input Measured variable	Differential pressure and flow		Reference conditions (in accor-  • Rising characteristi		ietic curvo
Span (infinitely adjustable)	Span (min max.)	Maximum operating pressure (static pressure)	dance with IEC 60770-1) All error information always refers to the set span.	<ul><li>Start of scale 0 b</li><li>Stainless steel se</li></ul>	ear eal diaphragm rith silicone oil filling
	1.00 50 mbar (0.4 20 inH <sub>2</sub> O) 1.25 250 mbar (0.5 100 inH <sub>2</sub> O) 6.25 1250 mbar (2.5 502 inH <sub>2</sub> O)	160 bar (2320 psi)	Error in measurement at limit setting incl. hysteresis and reproducibility r: Span ratio (r: Span ratio (r = max. span / set span))	10	l-> 10
	31.25 6250 mbar		Linear characteristic  • 50 mbar (20 inH <sub>2</sub> O)	r ≤ 10 ≤ 0.06 %	r ≥ 10 ≤ (0.006 · r) %
Lower range limit	(12.54 2509 inH <sub>2</sub> O) 0.16 32 bar (2.33 465 psi)		<ul> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> </ul>	≤ 0.06 % ≤ 0.03 %	≤ (0.008 °r) % ≤ (0.003 °r) %
9	100 % of may apan a	ndlor	32 bar (465 psi)		
<ul> <li>Measuring cell with silicone oil filling</li> </ul>	30 mbar a (0.44 psia)	na/or	Square-rooted characteristic	. 40	1
Upper range limit	100 % of max. span		• Flow > 50 %	r ≤ 10	r ≥ 10
Start of scale	Between measuring lin	nits (freely	- 50 mbar (20 inH <sub>2</sub> O)	≤ 0.06 %	≤ (0.006· r) %
	adjustable)		<ul> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> </ul>	≤ 0.03 %	≤ (0.003 · r) %
Output			6250 mbar (2509 inH̄ <sub>2</sub> Ó)		
Output current signal	4 20 mA		32 bar (465 psi)	. < 10	*> 10
<ul> <li>Lower current limit (freely adjustable)</li> </ul>	3.55 mA, factory settin	g 3.8 mA	<ul><li>Flow 25 % 50 %</li><li>50 mbar (20 inH<sub>2</sub>O)</li></ul>	r ≤ 10 ≤ 0.12 %	r ≥ 10 ≤ (0.012 · r) %
<ul> <li>Upper current limit (freely adjustable)</li> </ul>	23 mA, factory setting 20.5 mA		- 250 mbar (100 inH <sub>2</sub> O) 1250 mbar (502 inH <sub>2</sub> O)	≤ 0.06 %	≤ (0.006 · r) %
<ul> <li>Ripple (without HART communication)</li> </ul>	$I_{pp} \le 0.4$ % of max. output current		6250 mbar (2509 inH <sub>2</sub> O) 32 bar (465 psi)		
adjustable damping	0 100 s in steps of 0.1 s, factory-seting: 2 s		Influence of ambient tempera- ture per 28 °C (50 °F)		
• current transmitter	3.55 23 mA		• 50 mbar (20 inH <sub>2</sub> O)	≤ (0.04 · r + 0.05) %	
• Failure signal	adjustable within limits::		<ul> <li>250 mbar (100 inH<sub>2</sub>O)</li> </ul>	≤ (0.025 · r + 0.014) %	
	• Bottom: 3.55 3.7 r (default value: 3.6 m.		<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	≤ (0.006 · r + 0.03)	%
	<ul> <li>Top: 21.0 23 mA (default value: 22.8 r</li> </ul>	nA)	Influence of static pressure		
Load	D < /// 10 E \/\/0 00	02 A in O	<ul> <li>At the start of scale value (PKN)</li> </ul>		
<ul><li>Without HART communication</li><li>With HART communication</li></ul>	$U_{\rm H}$ : Power supply in V	23 A 111 \$2,	- 50 mbar (20 inH <sub>2</sub> O)	≤ (0.1 · r) % per 70 rection via zero po	bar (1015 psi) cor- int correction
- HART Communicator	P = 220 1100 0		- 250 mbar (100 inH <sub>2</sub> O)	≤ (0.035 · r) % per	
	$R_{\rm B} = 230 \dots 1100 \Omega$			correction via zero	
Characteristic curve Line	$R_{\rm B} = 230 \dots 500 \Omega$ Linearly rising, linearly falling, square rooted characteristic rising, bidirec-		<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	≤ (0.007 · r) % per correction via zero	
	tional square rooted chand user-specific	naracteristic	<ul><li>On the span (PKS)</li></ul>		
	and door-opeome		- 50 mbar (20 inH <sub>2</sub> O)	≤ 0.13 % per 70 ba	ar (1015 psi)
			<ul> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> </ul>	≤ 0.03 % per 70 ba	ar (1015 psi)
			- 6250 mbar (2509 inH <sub>2</sub> O)	≤ 0.09 % per 70 ba	ar (1015 psi)
			- 32 bar (465 psi)	≤ 0.05 % per 70 ba	ar (1015 psi)

Transmitters for applications with highest requirements (Premium)

## SITRANS P500 for differential pressure and flow

			SITRANS POULIC	or differential pressure and flow
Total Performance <sup>1)</sup>			Design	
Linear characteristic	$r \le 5$	5 < r ≤ 10	Weight (without options)	Approx. 3.3 kg (7.3 lb)
- 50 mbar (20 inH <sub>2</sub> O)	≤ 0.27 %	≤ 0.46 %	Material of parts in contact with	
- 250 mbar (100 inH <sub>2</sub> O)	≤ 0.14 %	≤ 0.27 %	the medium  • Seal diaphragm	
<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> </ul>	≤ 0.09 %	≤ 0.14 %	Process connection and seal-	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400
32 bar (465 psi)			ing screw	PN 160: stainless steel, matNo. 1.4404/316L
Square rooted characteristic	5	E	<ul> <li>Sealing material in the pro-</li> </ul>	
• Flow > 50 %	r ≤ 5	5 < r ≤ 10	cess connections	
- 50 mbar (20 inH <sub>2</sub> O)	≤ 0.27 %	≤ 0.46 %	- O-Ring	<ul> <li>Standard: Viton (FKM (FPM))</li> </ul>
- 250 mbar (100 inH <sub>2</sub> O)	≤ 0.14 %	≤ 0.27 %		• Optional:
<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	≤ 0.09 %	≤ 0.14 %		NBR PTFE (virginal) PTFE (glass fiber-reinforced)
• Flow 25 % 50 %	$r \le 5$	5 < r ≤ 10		FFPM (Kalrez) <sup>2)</sup>
- 50 mbar (20 inH <sub>2</sub> O)	≤ 0.54 %	≤ 0.92 %	Material of parts not in contact	Graphite
- 250 mbar (100 inH <sub>2</sub> O)	≤ 0.28 %	≤ 0.54 %	with media	
<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> <li>32 bar (465 psi)</li> </ul>	≤ 0.18 %	≤ 0.28 %	Electronics housing	Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706
Step response time T <sub>63</sub> without electrical damping		!		• Lacquer on polyurethane base, optional epoxy-based primer
• 50 mbar (20 inH <sub>2</sub> O)	≤ 140 ms, contains a dead time of ≤ 45 ms			<ul> <li>Stainless steel name plates (mat. no. 1.4404/316L)</li> </ul>
• 250 mbar (100 inH <sub>2</sub> O)	$\leq$ 88 ms, contains a dead time of $\leq$ 45 ms		Process connection screws	Stainless steel, mat. no. 1.4404/316L
1250 mbar (502 inH <sub>2</sub> O) 6250 mbar (2509 inH <sub>2</sub> O) 32 bar (465 psi)			Mounting bracket	Steel or stainless steel mat. no. 1.4301
Long-term stability	≤ (0.05 · r) % per 5 years		Measuring cell filling	Silicone oil
Long term etability	≤ (0.08 · r) % per 10 years		Process connection	1/4-18 NPT female thread and flange connection with M10 to DIN 19213 or
Influence of power supply	≤ 0.005 %/1 V			7/16-20 UNF mounting thread to IEC 61518
Rated conditions	Any		Electrical connection	Screw terminals
Mounting position	Ally			Cable entry via the following
Ambient conditions				screwed glands: - M20 x 1.5
Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)				<ul> <li>½-14 NPT</li> <li>Han 7D/Han 8D connector</li> <li>M12 plug</li> </ul>
- Total device	-40 +85 °C (-40		Displays and controls	
<ul><li>Readable display</li><li>Storage temperature</li></ul>	-20 +85 °C (-4 +185 °F) -50 +90 °C (-58 +194 °F)		Pushbuttons	3 for local programming directly on transmitter
Climatic class			Display	• With or without integrated display
Condensation	Relative humidity (condensation per		Auxiliary power supply	Cover with or without window
Degree of protection	IP66/IP 68 and NE	`	Terminal voltage on transmitter	• DC 10.6 44 V
(to IEC 60529)	sponding cable gla	and)	isinina voltage on transmitte	With intrinsically-safe operation
Electromagnetic Compatibility				DC 10.6 30 V
Emitted interference and inter- ference immunity				
Permissible pressures	According to 97/23 equipment directive			

Temperature of medium

Transmitters for applications with highest requirements (Premium)

Certificates and approvals		Explosion protection for USA	
Classification according to PED 97/23/EC		(to FM)	No. 2022012
• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids	Certificate of Compliance	No. 3033013
	of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4
Explosion protection			CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib IIC T4
Explosion protection for Europe (to ATEX)		<ul> <li>Permissible Ambient Temperature</li> </ul>	T <sub>a</sub> = T4: -40 +85 °C (-40 +185 °F)
<ul><li>Intrinsic safety "i"</li><li>Marking</li></ul>	PTB 09 ATEX 2004 X Ex II 1/2 G Ex ia/ib IIC T4		T <sub>a</sub> = T6: -40 +60 °C (-40 +140 °F)
Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	- Entity parameters	According to "control drawing": A5E02189134N
- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ ;	- Marilia a (NUNO)	$U_{\rm m} = 30 \text{ V, } I_{\rm m} = 100 \text{ mA,}$ $P_{\rm i} = 750 \text{ mW, } L_{\rm i} = 400 \mu\text{H} \text{ , } \text{Ci} = 6 \text{ nF}$
- Effective internal inductance:	$G_i = 300  \Omega$ $G_i = 300  \Omega$ $G_i = 400  \mu H$	<ul> <li>Marking (NI/NO)</li> </ul>	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW
- Effective inner capacitance:	$C_i = 6 \text{ nF}$		NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
<ul> <li>Explosion-proof "d"</li> <li>Marking</li> <li>Permissible ambient temperature</li> </ul>	BVS 09 ATEX E 027 Ex II 1/2 G Ex d IIC T4/T6 -40 +85 °C (-40 +185 °F) temperature class T4;	- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 ^{\circ}\text{C}$ $(-40 \dots +185 ^{\circ}\text{F})$ $T_a = T6: -40 \dots +60 ^{\circ}\text{C}$ $(-40 \dots +140 ^{\circ}\text{F})$
	-40 +60 °C (-40 +140 °F) temperature class T6	- (NI/S) parameters	According to "control drawing": A5E02189134N
- Connection	To circuits with values: $U_{\rm m} = DC \ 10.5 \dots 45 \ V$		$U_{m} = 45 \text{ V}, L_{i} = 400 \mu\text{H}, C_{i} = 6 \text{ nF},$
<ul> <li>Dust explosion protection for zone 20</li> </ul>	PTB 09 ATEX 2004 X	Explosion protection for Canada (to CCSAUS)	
- Marking	Ex II 1 D Ex iaD 20 T 120 °C	Certificate of Compliance	No. 2280963
- Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	<ul><li>Marking (XP/DIP)</li></ul>	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
<ul><li>Max. surface temperature</li><li>Connection</li></ul>	120 °C (248 °F) To certified intrinsically-safe circuits with peak values:	<ul> <li>Permissible ambient tem- perature</li> </ul>	$T_a = T4: -40 \dots +85 ^{\circ}\text{C} (-40 \dots +185 ^{\circ}\text{F})$ $T_a = T6: -40 \dots +60 ^{\circ}\text{C} (-40 \dots +140 ^{\circ}\text{F})$
- Effective internal induc-	$V_{i} = 30 \text{ V}, \ I_{i} = 100 \text{ mA}, \ P_{i} = 750 \text{ mW}, \ R_{i} = 300 \ \Omega$ $L_{i} = 400 \ \mu\text{H}$	- Entity parameters	According to "control drawing": A5E02189134N U <sub>m</sub> = 45 V
tance:		<ul><li>Marking (ia/ib)</li></ul>	CL I, Ex ia/Ex ib IIC, T4
<ul><li>Effective inner capacitance:</li><li>Dust explosion protection for</li></ul>	'		CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
zone 21/22 - Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia	<ul> <li>Permissible ambient temperature</li> </ul>	T <sub>a</sub> = T4: -40 +85 °C (-40 +185 °F)
- Connection	D21 To circuits with values: $U_{\rm m} = 10.5 \dots 45 \text{ V DC}; P_{\rm max} = 1.2 \text{ W}$	- Entity parameters	$U_i$ = 30 V, $I_i$ = 100 mA, $P_i$ = 750 mW, $R_i$ = 300 $\Omega$ , $L_i$ = 400 $\mu H, \ C_i$ = 6 nF
Type of protection "n" (zone 2) Marking  - "nA" connection		<ul> <li>Marking (NI/n)</li> </ul>	CL I, DIV 2, GP ABCD T4/T6 CL II, III, DIV 2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
<ul><li>"nL, ic" connection</li><li>Effective internal induc-</li></ul>	$U_i = 45 \text{ V}$ $L_i = 400 \mu\text{H}$	<ul> <li>Permissible ambient tem- perature</li> </ul>	T <sub>a</sub> = T4: -40 +85 °C (-40 +185 °F) T <sub>a</sub> = T6: -40 +60 °C (-40 +140 °F)
tance: - Effective inner capacitance:	$C_i = 6 \text{ nF}$	- NI/nA parameters	According to "control drawing": A5E02189134N U <sub>m</sub> = 45 V
		- nL parameters	According to "control drawing": A5E02189134N $U_i=45~V,~I_i=100~mA,~L_i=400~\mu H,~C_i=6~nF$

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 for differential pressure and flow

# Explosion protection for China (acc. to NEPSI)

• Intrinsic safety "i" GYJ111111X - Marking Ex ia/ib IIB/IIC T4

- Perm. ambient temperature 40 ... +85 °C (-40 ... +185 °F)

- Connection To certified intrinsically-safe circuits

with maximum values:

 $U_i = 30 \text{ V } I_i = 100 \text{ mA}, P_i = 750 \text{ mW}$ 

- Effective internal inductance  $L_i = 400 \text{ mH}$ - Effective inner capacitance C<sub>i</sub> = 6 nF

• Explosion-proof "d" GYJ111112 Ex dia IIC T4/T6 - Marking

- Permissible ambient tem-

perature

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;

-40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection To circuits with values:  $U_{m} = DC 10.5 ... 45 V$ 

Dust explosion protection for

GYJ111112

zone 21/22

DIP A21 TA,T120 °C IP68 D21 - Marking

- Connection To circuits with values:  $U_{m} = DC 10.5 ... 45 V$ 

• Type of protection "n" (zone 2) GYJ111111X

Ex nL IIB/IIC T4/T6 - Marking Ex nA II T4/T6

- Connection  $U_i = 45 \text{ V DC}$ - Effective internal inductance  $L_i = 400 \text{ mH}$ - Effective inner capacitance C<sub>i</sub> = 6 nF

Not in combination wiht span "G".

HART	communication
	••••••

Load with connection of

Protocol

 $R_{\rm B} = 230 \dots 1100 \,\Omega$  HART communicator  $R_{\rm B} = 230 \dots 500 \ \Omega$ • HART modem Cable 2 wire shielded: ≤ 3.0 km

(1.86 miles),

multiwire shielded: ≤ 1.5 km

(0.93 miles)

HART Version 6.0

PC/laptop requirements IBM compatible, RAM > 32 MByte,

hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection,

VGA graphics

SIMATIC PDM 6.0 Software for computer

<sup>1)</sup> The total performance includes the errors caused by temperature effects, static pressure effects and conformity error, including hysteresis and repea-

Transmitters for applications with highest requirements (Premium)

Selection and Ordering data			Article No.	
Pressure transmitters for differential pressure and flow, SITRANS P500 HART, PN 160 (MAWP 2320 psi)			7 M F 5 4 0	
${\ensuremath{\nearrow}}$ Click on the Article No. for	the online configuration in the P	IA Life Cycle Portal.		
Enclosure		Thread for cable gland		
Die-cast aluminum, dual comp	partment	M20x1.5	0	
Die-cast aluminum, dual comp	partment	½-14 NPT	1	
Output 4 20 mA, HART			3	
Measuring cell filling	Measuring cell cleaning			
Silicone oil	normal		1	
Measuring span		<del></del>		
1.00 50 mbar	(0.4 20 inH <sub>2</sub> O)		С	
1.25 250 mbar	(0.5 100.4 inH <sub>2</sub> O)		D	
6.25 1250 mbar	(2.5 502 inH <sub>2</sub> O)		E	
31.25 6250 mbar	(12.54 2509 inH <sub>2</sub> O)		F	
0.16 32 bar	(2.33 465 psi)		G	
Wetted parts materials (stainless steel process flange	es)			
Seal diaphragm	Process connection			
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	<del></del>	A	
Hastelloy C276 <sup>1)</sup>	Stainless steel 1.4404/316L		В	
Monel 400 <sup>1)</sup>	Stainless steel 1.4404/316L		c	
Process connection				
Female thread 1/4-18 NPT				
<ul> <li>Sealing screw opposite process connection</li> <li>Mounting thread 7/16 - 20 UNF according to EN 61518</li> <li>Mounting thread M10 to DIN 19213</li> </ul>			0 1	
<ul> <li>Vent on side of process flange<sup>2)</sup></li> <li>Mounting thread 7/16 - 20 UNF according to EN 61518</li> <li>Mounting thread M10 to DIN 19213</li> </ul>			4 5	

<sup>1)</sup> Not together with Measuring span "C".

<sup>2)</sup> Not in conjunction with remote seals (option V00).

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 for differential pressure and flow

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Attachments	
Mounting bracket made of steel	A01
Mounting bracket made of stainless steel	A02
<b>Display</b> (Standard: no display, cover closed)	
With display and blanking cover	A10
With display and glass cover	A11
Special casing / cover version	
Two coats of lacquer on casing, cover (PU on epoxy)	A20
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68) <sup>4)</sup>	A50
Cable glands made of metal (IP66/68)	A51
Cable glands made of stainless steel (IP66/68)	A52
M12 connectors without cable socket (IP66/67) <sup>4)</sup>	A60
M12 connectors complete with cable socket (IP66/67) <sup>4)</sup>	A61
Han 7D connectors, plastic, straight (with cable socket) (IP65) <sup>4)</sup>	A71
Han 7D connectors, plastic, angled (with cable socket) (IP65) <sup>4)</sup>	A72
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65) <sup>4)</sup>	A73
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65) <sup>4)</sup>	A74
Han 8D connectors, plastic, straight (with cable socket) (IP65) <sup>4)8)</sup>	A75
Han 8D connectors, plastic, angled (with cable socket) (IP65) <sup>4)8)</sup>	A76
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65) <sup>4)8)</sup>	A77
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65) <sup>4)8)</sup>	A78
PG 13.5 adapters <sup>4)</sup>	A82
Language for labels, leporellos, menu language	
default <sup>9)</sup> (instead of English as standard)	
German	B10
French	B12
Spanish	B13
Italian	B14
Chinese	B15
Russian	B16
Japanese	B17
English with units psi/inH <sub>2</sub> O/°F	B21
<b>Special version: Supplementary menu languages</b> (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	B80
Certificates (available online for downloading) <sup>1)</sup>	
Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2 <sup>2)</sup>	C11
Acceptance test certificate according to EN 10204-3.13)	C12

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Degree of protection approvals: Ex ia/ib (intrinsic safety) Ex ia/ib protection (ATEX) (T4)	E00
Ex IS protection (FM) (T4)  Ex IS protection ( <sub>C</sub> CSA <sub>US</sub> ) (T4)  Ex ia/ib protection (NEPSI) (T4)	E01 E02 E06
Degree of protection approvals: Ex d (flameproof)  Ex d explosion-proof (ATEX)(T4/T6)  Ex XP explosion-proof and DIP (FM)(T4/T6)  Ex XP explosion-proof and DIP ( <sub>C</sub> CSA <sub>US</sub> )(T4/T6)  Ex d explosion-proof (NEPSI)(T4/T6)	E20 E21 E22 E26
Degree of protection approvals: n/NI Zone 2 (nA, nL, ic) (ATEX) (T4/T6) Div2 NI, Div2 NI-field wiring (FM) (T4/T6) Zone 2 (nA, nL), Div2 NI ( <sub>C</sub> CSA <sub>US</sub> ) (T4/T6) Zone 2 (nA, nL) (NEPSI) (T4/T6)	E40 E41 E42 E46
Degree of protection approvals: Dust Zone 20/21/22 Use in Zone 21/22 (Ex tD) (ATEX) Use in Zone 20/21/22 (Ex iaD) (ATEX) Use in Zone 21/22 (Ex DIP) (NEPSI)	E60 E61 E66
Degree of protection approvals: Combinations IS protection and XP and DIP (FM) IS protection and XP and DIP ( <sub>C</sub> CSA <sub>US</sub> ) IS protection and XP and DIP (FM/ <sub>C</sub> CSA <sub>US</sub> )	E71 E72 E73
Supplementary approvals/degree of protection  Dual Seal approval <sup>5)</sup> Export approval Korea	E85 E86
Special process connection versions (diff. pressure) Side vents for gas measurements <sup>7)</sup> Swap process connection: high-pressure side at front Mosquito protection	L32 L33
4 pcs. for ¼-18 NPT thread  Process flanges, O-rings, special material Standard: Viton (FKM (FPM)	L36
Process conn. sealing rings made of PTFE (Teflon), virginal Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	L60 L61
Process connection sealing rings made of FFPM (Kalrez) <sup>10)</sup> Process connection sealing rings made of NBR Process connection sealing rings made of graphite	L62 L63 L64
Drain/Vent valve (1 set = 2 units)  2 ventilation valves ¼- 18 NPT, in material of process flanges)	L80
Remote seals  Transmitters with connection of remote seal <sup>6)</sup> (For premounted valve manifolds see page 1/264)	V00

1) Enclosed in print or as DVD: see page 1/262.

When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

<sup>3)</sup> When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

<sup>4)</sup> Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

 $<sup>^{5)}</sup>$  Only in conjunction with FM and/or  $_{\mbox{\scriptsize C}}\mbox{CSA}_{\mbox{\scriptsize US}}$ 

<sup>6)</sup> Please select a remote seal separately. Also refer to the information under footnote 2). Remote seals see page 1/199.

<sup>7)</sup> Only in conjunction with process connection "Vent on side".

<sup>8)</sup> The Han 8D plug is identical with the former Han 8U version.

<sup>&</sup>lt;sup>9)</sup> For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

<sup>&</sup>lt;sup>10)</sup>Not together with Measuring span "G".

Transmitters for applications with highest requirements (Premium)

## SITRANS P500 for differential pressure and flow

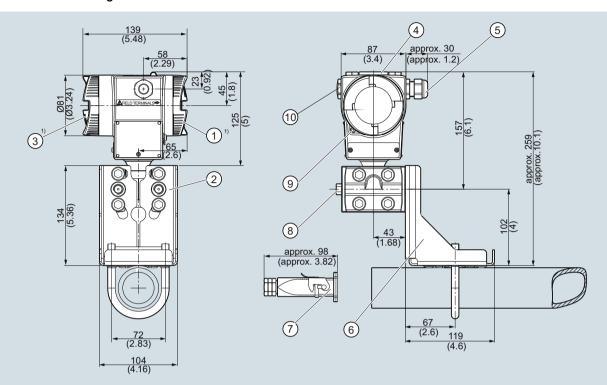
Selection and Ordering data	Order code
Additional data	Cidel Code
Please add "-2" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
<ul> <li>In the case of linear characteristic curve (max. 5 characters):</li> <li>Y01: up to mbar, bar, kPa, MPa, psi</li> </ul>	Y01
<ul> <li>In the case of square rooted characteristic (max. 5 characters):</li> <li>Y02: up to mbar, bar, kPa, MPa, psi</li> </ul>	Y02
Measuring point number and measuring point identifier (only standard ASCII character set)	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters	Y15
Y15:	
Measuring point text (max. 27 char.) Y16:	Y16
Entry of HART address (TAG), max. 32 characters Y17:	Y17
Setting of pressure indication in pressure units	Y21
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi,	
Note: The following pressure units are selectable: bar, mbar, mm $H_2O^*$ ), in $H_2O^*$ ), ft $H_2O^*$ ), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM, % or mA	
*) Reference temperature 20 °C	
Setting of pressure indication in non-pressure units <sup>1)</sup> Specify in plain text:	Y22 + Y01 or Y02
Y22: up to l/min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	
Customer-specific settings	
Damping setting (range: 0 100 s) (Standard setting: 2 s)	Y30

<sup>1)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 for differential pressure and flow

### Dimensional drawings



- Terminal side
- 2 Process connection: 1/4-18 NPT (EN 61518)
- Electronics side, digital display
  Protective cover for the pushbuttons
- Cable entry:
  - Screwed gland M20 x 1.53)
  - Screwed gland ½-14 NPT Han 7D/Han 8D connector<sup>2)3)</sup>

  - M12 connector
- Mounting bracket (optional)

- Electrical connection:
  - Han 7D/Han 8D connector/socket<sup>2)3)</sup>
- Vent valve (optional)
- Safety catch 9
- 10 Blanking plug
- Allow approx. 20 mm (0.79 inch) additional thread length
- Not with type of protection "Explosion-proof" Not with type of protection "FM + <sub>c</sub>CSA<sub>US</sub> [IS + XP]"

SITRANS P pressure transmitter for differential pressure and flow, P500 series, measurements in mm (inch)

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level			
Technical specifications			
Input			
Measured variable	Level		
Span (infinitely adjustable)	Span (min max.)	) Maximum operating pressure	
	1.25 250 mbar (0.5 100 inH <sub>2</sub> O)		
	6.25 1250 mbar (2.5 500 inH <sub>2</sub> O)	See "Mounting flange"	
	31.25 6250 mbai (12.54 2509 inH <sub>2</sub> O)		
Lower range limit			
Measuring cell with silicone oil filling	(7.25 psia) vacuum Also available as va	resistance acuum-resistant	
Upper range limit	remote seal: 30 mb		
Start of scale	Between measuring		
otal to oddio	adjustable)	g illinite (ineery	
Output			
Output current signal	4 20 mA		
<ul> <li>Lower current limit (freely adjustable)</li> </ul>	3.55 mA, factory setting 3.8 mA		
<ul> <li>Upper current limit (freely adjustable)</li> </ul>	23 mA, factory setting 20.5 mA		
<ul> <li>Ripple (without HART communication)</li> </ul>	I <sub>pp</sub> ≤ 0.4 of max. output current		
adjustable damping	0 100 s in steps of 0.1 s, factory setting 2 s $$		
<ul> <li>current transmitter</li> </ul>	3.55 23 mA		
Failure signal	Adjustable within limits: • Lower: 3.55 3.7 mA (factory set-		
	ting 3.6 mA)  • Upper: 21.0 23 mA (factory setting 22.8 mA)		
Load	,		
Without HART communication	$R_{\rm B} \le (U_{\rm H}$ - 10.5 V)/0.023 A in $\Omega$ , $U_{\rm H}$ : Power supply in V		
<ul> <li>With HART communication</li> </ul>			
- HART Communicator	$R_{\rm B} = 230 \dots 1100  \Omega$	2	
- HART modem	$R_{\rm B}=230\ldots500\Omega$		
Characteristic curve	Linearly rising or linuser-specific	nearly falling and	
Measuring accuracy			
Reference conditions (in accordance with IEC 60770-1)	<ul><li>Rising characteris</li><li>Start of scale 0 ba</li></ul>		
All error information always	Stainless steel se		
refers to the set span.	<ul><li>Measuring cell wi</li><li>Room temperatur</li></ul>		
Error in measurement at limit setting incl. hysteresis and reproducibility	ricom tomporata	0 (20 0 (17 1))	
r: Span ratio (r = max. span / set span)			
Linear characteristic	r ≤ 10	r ≥ 10	
• 250 mbar (100 inH <sub>2</sub> O) 1250 mbar (502 inH <sub>2</sub> O) 6250 mbar (2509 inH <sub>2</sub> O)	≤ 0.03 %	≤ (0.003 · r) %	

Long-term stability	≤ (0.05 · r) % per 5 years
	≤ (0.08 · r) % per 10 years
Influence of ambient temperature per 28 °C (50 °F) <sup>1)</sup>	
• 250 mbar (100 inH <sub>2</sub> O)	≤ (0.025 · r + 0.014) %
<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> </ul>	≤ (0.006 · r + 0.03) %
Influence of static pressure	
<ul> <li>At the start of scale value (PKN)<sup>1) 2)</sup></li> </ul>	
- 250 mbar (100 inH <sub>2</sub> O)	$\leq$ (0.035 · r) % je 70 bar (1015 psi) correction via zero point correction
<ul> <li>1250 mbar (502 inH<sub>2</sub>O)</li> <li>6250 mbar (2509 inH<sub>2</sub>O)</li> </ul>	$\leq$ (0.007 · r) % je 70 bar (1015 psi) correction via zero point correction
<ul> <li>On the span (PKS)<sup>1)</sup></li> </ul>	
<ul> <li>250 mbar (100 inH<sub>2</sub>O)</li> <li>1250 mbar (502 inH<sub>2</sub>O)</li> </ul>	≤ 0.03 % je 70 bar (1015 psi)
- 6250 mbar (2509 inH <sub>2</sub> O)	≤ 0.09 % je 70 bar (1015 psi)
Influence of power supply	≤ 0.005 %/1 V
Rated conditions	
Mounting position	Defined by flange
Ambient conditions	
Ambient temperature (Note: Observe the tempera- ture class in areas subject to explosion hazard.)     total device     Readable display	-40 +85 °C (-40 +185 °F) -20 +85 °C (-4 +185 °F)
- Storage temperature	-50 +90 °C (-58 +194 °F)
Climatic class	
Condensation	Relative humidity 0 100 % (condensation permissible)
Degree of protection to IEC 60529	IP66/IP68 and NEMA 4X (with corresponding cable gland)
Electromagnetic Compatibility	
Emitted interference and inter- ference immunity	Acc. to IEC 61326 and NAMUR NE 21
Permissible pressures	According to 97/23/EC pressure equipment directive
Medium temperature of high- pressure side	
Measuring cell with silicone oil filling	0)
- p <sub>abs</sub> ≥ 1 bar	-40 +175 <sup>3)</sup> °C (-40 +347 <sup>3)</sup> °F)
- p <sub>abs</sub> < 1 bar	-40 +80 °C (-40 +176 °F)
Design	
Weight	
<ul> <li>To EN (pressure transmitter with mounting flange, without tube)</li> </ul>	approx. 9.8 11.8 kg (21.6 26.0 (lb)
<ul> <li>To ASME (pressure transmitter with mounting flange, without tube)</li> </ul>	approx. 9.8 16.8 kg (21.6 37.0 lb)

## Transmitters for applications with highest requirements (Premium)

## SITRANS P500 for level

			STIRANS P500 for level
Material of wetted parts at the high-pressure side		Auxiliary power supply	
Seal diaphragm of mounting	Stainless steel 1.4404/316L,	Terminal voltage on transmitter	• DC 10.6 44 V
flange	Hastelloy C276, mat. no. 2.4819, Monel 400, mat. no. 2.4360, Tantal,		<ul> <li>With intrinsically-safe operation DC 10.6 30 V</li> </ul>
	PFA auf Edelstahl 1.4404/316L,	Certificates and approvals	
Sealing face	PTFE auf Edelstahl 1.4404/316L Smooth to EN 1092-1, Form B1 and/or	Classification according to PED 97/23/EC	
	ASME B16.5 RF 125 250 AA for stainless steel316L, EN 1092-1 Form B2 and/or ASME B16.5 RFSF in the case of other materials	• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
<ul> <li>Sealing material in the process connection</li> </ul>		Explosion protection	(Journal origination)
- O-Ring	• Standard: Viton (FKM (FPM))	Explosion protection for Europe (to ATEX)	
	Optional:	Intrinsic safety "i"	PTB 09 ATEX 2004 X
	NBR PTFE (virginal)	- Marking	Ex II 1/2 G Ex ia/ib IIC T4
	PTFE (glas fiber-reinforced) FFPM (Kalrez) Graphite	<ul> <li>Permissible ambient temperature</li> </ul>	-40 +85 °C (-40 +185 °F)
<ul> <li>For vacuum application of mounting flange</li> </ul>	Copper	- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$ , $I_i = 100 \text{ mA}$ , $P_i = 750 \text{ mW}$ ;
Material of wetted parts at the low-pressure side		E#	$R_{\rm i} = 300 \ \Omega$
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400	<ul> <li>Effective internal inductance:</li> </ul>	L <sub>i</sub> = 400 μH
Process connection and seal-	• Stainless steel, mat. no. 1.4404/316L	- Effective inner capacitance:	$C_i = 6 \text{ nF}$
ing screw	Starriess steer, mat. no. 1.4404/010E	<ul><li>Explosion-proof "d"</li></ul>	BVS 09 ATEX E 027
Sealing material in the pro-		- Marking	Ex II 1/2 G Ex d IIC T4/T6
cess connection - O-Ring	Standard:     Viton (FKM (FPM))     Onlineal:	<ul> <li>Permissible ambient tem- perature</li> </ul>	-40 +85 °C (-40 +185 °F) temperature class T4; -40 +60 °C (-40 +140 °F) temperature class T6
	<ul><li>Optional: NBR PTFE (virginal)</li></ul>	- Connection	To circuits with values: $U_{\rm m} = {\rm DC \ 10.5 \ \ 45 \ V}$
	PTFE (glas fiber-reinforced) FFPM (Kalrez) Graphite	<ul> <li>Dust explosion protection for zone 20</li> </ul>	PTB 09 ATEX 2004 X
Material of parts not in contact	S. 545	- Marking	Ex II 1 D Ex iaD 20 T 120 °C
with media Electronics housing	Low copper die-cast aluminum	<ul> <li>Permissible ambient tem- perature</li> </ul>	-40 +85 °C (-40 +185 °F)
Liectroffics flousing	AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706	- Max. surface temperature	120 °C (248 °F)
	Lacquer on polyurethane base, optional epoxy-based primer     Stainless steel serial plate	- Connection	To certified intrinsically-safe circuits with peak values: $U_i$ = 30 V, $I_i$ = 100 mA, $P_i$ = 750 mW, $R_i$ = 300 $\Omega$
Process connection screws	Stainless steel	- Effective internal induc-	L <sub>i</sub> = 400 μH
Measuring cell filling	Silicone oil	tance:	
<ul> <li>Liquid mounting flange</li> </ul>	Silicone oil or other material	- Effective inner capacitance:	'
Process connection		<ul> <li>Dust explosion protection for zone 21/22</li> </ul>	BVS 09 ATEX E 027
<ul> <li>High-pressure side</li> </ul>	Flange to EN and ASME	- Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia
• Low-pressure side	1/4-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC	- Connection	D21 To circuits with values:
	61518	• Type of protection "n"	$U_{H}$ = 10.5 45 V DC; $P_{max}$ = 1.2 W PTB 09 ATEX 2004 X
Electrical connection	<ul> <li>Screw terminals</li> <li>Cable entry via the following screwed glands:</li> <li>M20 x 1.5</li> <li>½-14 NPT</li> <li>Han 7D/Han 8D connector</li> </ul>	(zone 2) - Marking - "nA" connection	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6 U <sub>m</sub> = 45 V DC
	- M12 plug	- "nL, ic" connection	$U_i = 45 \text{ V}$
Displays and controls		- Effective internal inductance	1
Push buttons	3; for operation directly on the device	- Effective inner capacitance	'
Display	With or without integrated display     Cover with or without window		-1

• Cover with or without window

Transmitters for applications with highest requirements (Premium)

### **SITRANS P500 for level**

Explosion protection for USA (to FM)	
Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEX ia IIC T4
- Permissible Ambient Temperature	CL I, Zone 1, AEX ib IIC T4  T <sub>a</sub> = T4: -40 +85 °C  (-40 +185 °F)  T <sub>a</sub> = T6: -40 +60 °C  (-40 +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N $U_m=30~V,~I_m=100~mA,\\P_i=750~mW,~L_i=400~\mu H~,~C_i=6~nF$
Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Tem- perature	$T_a = T4: -40 \dots +85 ^{\circ}C$ $(-40 \dots +185 ^{\circ}F)$ $T_a = T6: -40 \dots +60 ^{\circ}C$ $(-40 \dots +140 ^{\circ}F)$
- (NI/S) parameters	According to "control drawing": A5E02189134N $U_{\rm m}=45$ V, L $_{\rm i}=400$ $\mu$ H, Ci = 6 nF
Explosion protection for Canada	
(to <sub>C</sub> CSA <sub>US</sub> )	
Certificate of Compliance	No. 2280963
Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Tem- perature	$T_a = T4: -40 \dots +85 ^{\circ}C$ $(-40 \dots +185 ^{\circ}F)$ $T_a = T6: -40 \dots +60 ^{\circ}C$ $(-40 \dots +140 ^{\circ}F)$
- Entity parameters	According to "control drawing": A5E02189134N, U <sub>m</sub> = 45 V
Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
<ul> <li>Permissible Ambient Temperature</li> </ul>	T <sub>a</sub> = T4: -40 +85 °C (-40 +185 °F)
- Entity parameters	$\begin{array}{l} U_i = 30 \text{ V, } I_i = 100 \text{ mA, } P_i = 750 \text{ mW,} \\ R_i = 300 \ \Omega \text{ , } L_i = 400 \ \mu\text{H, } C_i = 6 \text{ nF} \end{array}$
Marking (NI/n)	CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Tem- perature	$T_a = T4: -40 \dots +85 ^{\circ}C$ $(-40 \dots +185 ^{\circ}F)$ $T_a = T6: -40 \dots +60 ^{\circ}C$ $(-40 \dots +140 ^{\circ}F)$
- NI/nA parameters	According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$
- nL parameters	According to "control drawing": A5E02189134N, $U_i$ = 45 V, $I_i$ = 100 mA, $L_i$ = 400 $\mu$ H, $C_i$ = 6 nF

Explosion protection for China (acc. to NEPSI)	
Intrinsic safety "i"	GYJ111111X
- Marking	Ex ia/ib IIB/IIC T4
Permissible ambient temperature	40 +85 °C (-40 +185 °F)
- Connection	To certified intrinsically-safe circuits with maximum values:
	$U_i = 30 \text{ V } I_i = 100 \text{ mA}, P_i = 750 \text{ mW}$
- Effective internal inductance	$L_i = 400 \text{ mH}$
- Effective inner capacitance	$C_i = 6 \text{ nF}$
<ul><li>Explosion-proof "d"</li></ul>	GYJ111112
- Marking	Ex dia IIC T4/T6
<ul> <li>Permissible ambient tem- perature</li> </ul>	-40 +85 °C (-40 +185 °F) temperature class T4;
	-40 +60 °C (-40 +140 °F) temperature class T6
- Connection	To circuits with values: U <sub>m</sub> = DC 10.5 45 V
<ul> <li>Dust explosion protection for zone 21/22</li> </ul>	GYJ111112
- Marking	DIP A21 TA,T120 °C IP68 D21
- Connection	To circuits with values: U <sub>m</sub> = DC 10.5 45 V
• Type of protection "n" (zone 2)	GYJ111111X
- Marking	Ex nL IIB/IIC T4/T6 Ex nA II T4/T6
- Connection	U <sub>i</sub> = 45 V DC

Only relevant for the pressure transmitter. The temperature error of the remote seal must calculated separately.
 If the Type "D" measuring cell is used, the error should be increased by a factor of 5. This error can be reduced to 0 by a means of a zero adjustment.
 This value may be increased if the process connection is sufficiently insulated.

- Effective internal inductance L<sub>i</sub> = 400 mH - Effective inner capacitance  $C_i = 6 \text{ nF}$ 

HART	communication
------	---------------

Software for computer

HART communication	
Load with connection of	
<ul> <li>HART Communicator</li> </ul>	$R_{B} = 230 \; \; 1100 \; \Omega$
HART modem	$R_{B} = 230 \; \; 500 \; \Omega$
Cable	2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics

SIMATIC PDM 6.0

Transmitters for applications with highest requirements (Premium)

Selection and Ordering data			Order co
Pressure transmitters for lev	vel, SITRANS P500 HART	7 M F 5 6 - 0 - 0 - 0 -	
✓ Click on the Article No. for	the online configuration in the PIA Life Cycle Portal.		
Enclosure	Thread for cable gland		
Die-cast aluminum, dual com	<u> </u>	0	
Die-cast aluminum, dual com		1	
Output			
4 20 mA, HART		3	
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Measuring span (min ma	x.)		
1.25 250 mbar	(0.5 100 inH <sub>2</sub> O)	D	
6.25 1250 mbar	(2.5 500 inH <sub>2</sub> O)	E	
31.25 6250 mbar	(12.54 2509 inH <sub>2</sub> O)	F	
Wetted parts of the low-pres (stainless steel process flange			
Seal diaphragm	Process connection		
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	A	
Hastelloy C276	Stainless steel 1.4404/316L	B	
Monel 400	Stainless steel 1.4404/316L	C	
Process connection of low-			
Female thread 1/4-18 NPT			
Sealing screw opposite productions	cess connection		
	UNF according to IEC 61518	0	
- Mounting thread M10 to D		1	
<ul> <li>Vent on side of process fland</li> </ul>			
	UNF according to IEC 61518	4	
- Mounting thread 7/10 - 20		5	
Wetted parts materials (high			
	, procedure state)		
Stainless steel 1.4404/316L	10	0	
Hastelloy C276 mat. no. 2.481	ıə	1	
Monel 400 mat. no. 2.4360 Tantalum		2 3	
rantaium PFA coated on stainless steel		3	
	4/316L (not in combination with an extension)	6 A	
Other version	TO THE THE OTHER MILL WILL ALL CALCULATION	9 Y	N
Add Order code and plain tex	xt:	3 1	
Material: ; Extension length			
Process connection on high	pressure side: Extension length		
None		A	
50 mm (1.97 inch)		В	
100 mm (3.94 inch)		С	
150 mm (5.90 inch)		D	
200 mm (7.87 inch)		E	
Other version: See option "9" f	for "Wetted parts materials"		
Process connection on high	-pressure side: Nominal diameter/Nominal pressure		
DN 50, PN 40 <sup>6)</sup>		E	
DN 80, PN 40			
DN 100, PN 16		d	
DN 100, PN 40		H	
2", class 150 <sup>6)</sup>		L	
2", class 300 <sup>6)</sup>		N	1
3", class 150			2
3", class 300		F	
4", class 150		1	
4", class 300		L	
Other version, add		Z	Q ·
Order code and plain text: Nominal diameter: ; Nomina			
	al procediro:		

Transmitters for applications with highest requirements (Premium)

Selection and Ordering data	Article No.	Ord	er c	ode	4
Pressure transmitters for level, SITRANS P500 HART	7 M F 5 6 0 - 0 - 1				ĺ
Process connection on high-pressure side: Filling liquid					ĺ
Silicone oil M5		0			
Silicone oil M50		1			
High-temperature oil		2			
Halocarbon (for oxygen measurement)		3			
FDA compliant oil		4			
Other version, add Order code and plain text: Filling liquid:		9	F	R 1 Y	

Transmitters for applications with highest requirements (Premium)

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.  Display	
(Standard: no display, cover closed)	
With display and blanking cover	A10
With display and glass cover	A11
Special version: cover/casing	
Two coats of lacquer on casing, cover (PU on epoxy)	A20
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68) <sup>4)</sup>	A50
Cable glands made of metal (IP66/68)	A51
Cable glands made of stainless steel (IP66/68)	A52
M12 connectors without cable socket (IP66/67) <sup>4)</sup>	A60
M12 connectors, cable socket (IP66/67) <sup>4)</sup>	A61
Han 7D connectors, plastic, straight (with cable socket) (IP65) <sup>4)</sup>	A71
Han 7D connectors, plastic, angled (with cable socket) (IP65) <sup>4)</sup>	A72
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65) <sup>4)</sup>	A73
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65) <sup>4)</sup>	A74
Han 8D connectors, plastic, straight (with cable socket) (IP65) <sup>4)7)</sup>	A75
Han 8D connectors, plastic, angled (with cable socket) (IP65) <sup>4)7)</sup>	A76
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65) <sup>4)7)</sup>	A77
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65) <sup>4)7)</sup>	A78
PG 13.5 adapters <sup>4)</sup>	A82
Language for labels, leporellos and menu language default <sup>8)</sup>	
(instead of English as standard)	
German	B10
French	B12
Spanish	B13
Italian	B14
Chinese	B15
Russian	B16
Japanese	B17
English with units: psi/inH <sub>2</sub> O	B21
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	B80
Certificates (available online for downloading) <sup>1)</sup>	011
Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2 <sup>2</sup> )	C11
Acceptance test certificate according to EN 10204-3.1 <sup>3)</sup>	C12
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	E00
Ex IS protection (FM) (T4)	E01
Ex IS protection ( <sub>C</sub> CSA <sub>US</sub> ) (T4)	E02
Ex ia/ib protection (NEPSI) (T4)	E06

Selection and Ordering data	Order code
Further designs Add "-2" to Article No. and specify Order code.	
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	E20
Ex XP explosion-proof and DIP (FM)(T4/T6)	E21
Ex XP explosion-proof and DIP ( <sub>C</sub> CSA <sub>US</sub> )(T4/T6)	E22
Ex d explosion-proof (NEPSI)(T4/T6)	E26
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	E40
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	E41
Zone 2 (nA, nL), Div2 NI ( <sub>C</sub> CSA <sub>US</sub> ) (T4/T6)	E42
Zone 2 (nA, nL) (NEPSI) (T4/T6)	E46
Degree of protection approvals: Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX)	E60
Use in Zone 20/21/22 (Ex iaD) (ATEX)	E61
Use in Zone (Ex DIP) (ATEX)	E66
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	E71
IS protection and XP and DIP (CCSAUS)	E72
IS protection and XP and DIP (FM/ <sub>C</sub> CSA <sub>US</sub> )	E73
Supplementary approvals / degree of protection	
Dual Seal approval <sup>5)</sup>	E85
Export approval Korea	E86
Special process connection versions (diff. pressure)	
Swap process connection: high-pressure side at front	L33
Mosquito protection 4 pcs. for 1/4-18 NPT thread	L36
Process flanges, O-rings, special material	
Standard: Viton (FKM (FPM)	
Process connection sealing rings made of PTFE (Teflon), virginal	L60
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	L61
Process connection sealing rings made of FFPM (Kalrez)	L62
Process connection sealing rings made of NBR	L63
Process connection sealing rings made of graphite	L64
<b>Drain/Vent valve</b> (1 set = 2 units)	
2 ventilation valves 1/4- 18 NPT, in material of process flange)	L80
Vacuum-proof design	
Vacuum service	V04
Spark arrester For mounting on zone 0 (including documentation)	V05

- 1) Enclosed in print or as DVD: see page 1/262.
- When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.
- 3) When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.
- 4) Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"
- $^{5)}$  Only in conjunction with FM and/or  $_{\rm C}{\rm CSA}_{\rm US}$
- 6) Not recommended for Measuring span "D"
- $^{7)}\,$  The Han 8D plug is identical with the former Han 8U version.
- 8) For option B15, B16 and B17 the menu language default is English. Otherwise the Option B80 (Asia language package) is necessary.

Transmitters for applications with highest requirements (Premium)

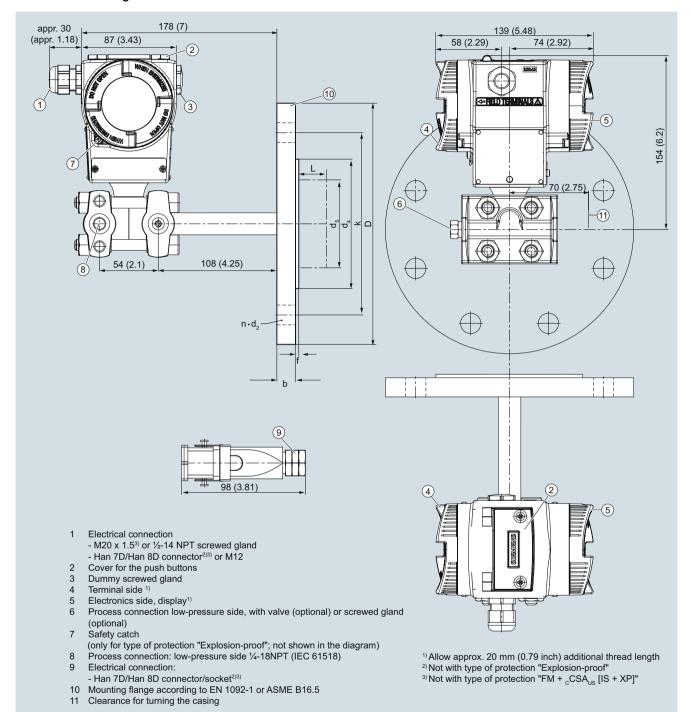
Selection and ordering data	Order code
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
Linear characteristic curve (max. 5 characters): Y01: up to mbar, kPa, MPa, psi	Y01
Measuring point number and measuring point identifier (only standard ASCII character set)	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15:	Y15
Measuring point text (max. 27 char.) Y16:	Y16
Entry of HART address (TAG), max. 32 characters Y17:	Y17
Setting of pressure indication in pressure units	Y21
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi,	
Note: The following pressure units are selectable: bar, mbar, mm $H_2O^*$ ), in $H_2O^*$ ), ft $H_2O^*$ ), mmHG, inHG, psi, Pa, kPa, MPa, $g/cm^2$ , $kg/cm^2$ , Torr, ATM, % or mA	
*) Reference temperature 20 °C	
Setting of pressure indication in non-pressure units <sup>1)</sup> Specify in plain text: Y22: up to I/min, m³/h, m, USgpm, (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01
Customer-specific settings	
Damping setting (range: 0 100 s) (Standard setting: 2 s)	Y30

<sup>1)</sup> Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with highest requirements (Premium)

SITRANS P500 for level

### Dimensional drawings



SITRANS P pressure transmitter for filling level, P500 series, measurements in mm (inch)

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 for level

### Connection to EN 1092-1

Nominal diameter	Nominal pressure		D	d	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>M</sub>	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm		mm
DN50	PN 40	20	165	61	18	102	48.3	45 <sup>1)</sup>	2	125	4	
DN 80	PN 40	24	200	90	18	138	76	72 <sup>2)</sup>	2	160	8	0, 50, 100,
DN 100	PN 16	20	220	115	18	158	94	89	2	180	8	150 or 200
	PN 40	24	235	115	22	162	94	89	2	190	8	

### Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d <sub>2</sub>	d <sub>4</sub>	<b>d</b> <sub>5</sub>	d <sub>M</sub>	f	k	n	L
	lb/sq.in.	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
2 inch	class 150	0.77 (19.5)	5.91 (150)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45) <sup>1)</sup>	0.079 (2.0)	4.75 (120.7)	4	0, 2, 3.94,
	class 300	0.89 (22.7)	6.49 (165)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45) <sup>1)</sup>	0.079 (2.0)	5.0 (127)	8	5.94 or 7.87
3 inch	class 150	0.96 (24.3)	7.5 (190.5)	0.75 (19.0)	5 (127)	3.0 (76)	2.83 (72) <sup>2)</sup>	0.079 (2.0)	6 (152.4)	4	(0, 50,
	class 300	1.14 (29.0)	8.27 (210)	0.87 (22.2)	5 (127)	3.0 (76)	2.83 (72) <sup>2)</sup>	0.079 (2.0)	6.69 (168.3)	8	100, 150 or 200)
4 inch	class 150	0.96 (24.3)	9.06 (230)	0.75 (19.0)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.5 (190.5)	8	
	class 300	1.27 (32.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.88 (200)	8	

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d<sub>M</sub>: Effective diaphragm diameter

d<sub>5</sub>: Diameter of extension

f: Milling edge

L: Extension length

 $^{1)}$  59 mm = 2.32 inch with tube length L=0.

<sup>2)</sup> 89 mm =  $3\frac{1}{2}$  inch with tube length L=0.

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 - Supplementary electronics for 4-wire connection

### Overview



SITRANS P pressure transmitter with supplementary electronics for 4-wire connection

Direct connection of the supplementary electronics to a SITRANS P pressure transmitter from the P500 series produces a transmitter for four-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

#### Note on ordering:

The supplementary electronics has to be be ordered through the **supplementary options** of the pressure transmitter in question.

#### Technical specifications

lechnical specifications			
Output			
Output signal	0 20 mA or 4 20 mA		
Load	Max. 750 Ω		
Voltage measurement	Linear (square-rooting in transmit ter if necessary)		
Electrical isolation	Between power supply and input output		
Measuring accuracy	According to IEC 60770-1		
Conformity error (in addition to transmitter)	≤ 0.15 % of set span		
Influence of ambient temperature	≤ 0.1 % per 10 K		
Power supply effect	$\leq$ 0.1 % per 10 % change in voltage or frequency		
Load effect	≤ 0.1 % per 100 % change		
Rated conditions			
Ambient temperature			
• 24 V version	-20 +80 °C (-4 +176 °F)		
• 230 V version	-20 +60 °C (-4 +140 °F)		
Storage temperature	-50 +85 °C (-58 +185 °F)		
Degree of protection	IP54 to IEC 60529		
Electromagnetic compatibility (EMC)	IEC 61236-1		
Condensation	Relative humidity 0 95 % condensation permissible		

#### Structural design

Dimensions (W x H x D) in mm

(inch)

Electrical connection

80 x 120 x 60 (3.15 x 4.72 x 2.36)

Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug

#### Power supply

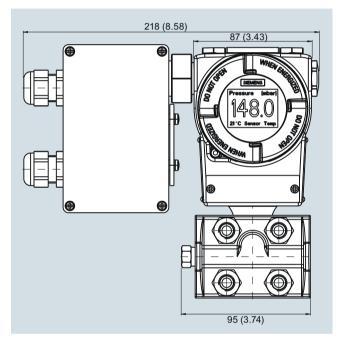
Supply voltage

230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA)

Permissible ripple (within the specified limits)

Approx. 2.5 V<sub>pp</sub>

#### Dimensional drawings

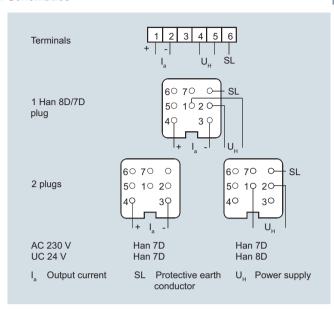


SITRANS P pressure transmitters with supplementary electronics for fourwire connection, dimension drawing, dimensions in mm (inch)

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 - Supplementary electronics for 4-wire connection

### Schematics



Supplementary electronics for 4-wire connection, connection diagram (the HAN 8D conector is identical to the previous version of the HAN 8U)

Selection and	Order code				
connection Article No. of th	or <b>7MF56</b> add "-Z"	V			
Power supply	Electrical connection				
24 V AC/DC	Terminals; 2 Pg screwed glands, to left	1			
	2 Han 7D/Han 8D plugs incl. mating connector, to left	3	3		
	1 Han 7D plug incl. mating connector, angled	5	i		
	Terminals; 1 Pg screwed gland, downwards	6	i		
	1 Han 8D plug incl. mating connector, downwards (observe arrangement of plug and differential pressure line)	9			
230 V AC	Terminals; 2 Pg screwed glands, to left	7			
	2 Han 7D plugs incl. mating connector, to left	8	3		
Output current	!				
0 20 mA 4 20 mA			0 1		
Accessories		Art	icl	e No.	
Instruction Manual			A5E00322799		

German/English

Transmitters for applications with highest requirements (Premium)

SITRANS P500 Accessories/Spare parts

	ng data	Article No.
	ring cells for differential	7MF5994-
	ransmitters for differential 00 HART PN 160 series	1
	No. for the online configura- Cycle Portal.	
Measuring cell filling Silicone oil	Measuring cell cleaning normal	1
Measuring span (mir 1.00 50 mbar 1.25 250 mbar 6.25 1250 mbar 31.25 6250 mbar 0.16 32 bar	1 max.) (0.4 20 inH <sub>2</sub> O) (0.5 100 inH <sub>2</sub> O) (2.5 502 inH <sub>2</sub> O) (12.54 2509 inH <sub>2</sub> O) (2.33 465 psi)	C D E F
Wetted parts materia	ıls	
(stainless steel proces	ss flanges)	
Seal diaphragm	Parts of measuring cell	_ ]
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	A
Hastelloy C276 <sup>1)</sup>	Stainless steel1.4404/316L	В
Monel 400 <sup>1)</sup>	Stainless steel1.4404/316L	С
<ul> <li>Mounting thread <sup>7</sup>/</li> <li>Mounting thread N</li> </ul>	site process connection / <sub>16</sub> -20 UNF to IEC 61518	0
- Mounting thread <sup>7</sup> /	1 <sub>16</sub> -20 UNF to IEC 61518	4
<ul> <li>Mounting thread <sup>7</sup>/</li> <li>Mounting thread N</li> </ul>	1 <sub>16</sub> -20 UNF to IEC 61518	4 5
<ul> <li>Mounting thread <sup>7</sup>/</li> <li>Mounting thread M</li> </ul> Further designs	/ <sub>16</sub> -20 UNF to IEC 61518 110 to DIN 19213	4
<ul> <li>Mounting thread <sup>7</sup>/<sub>2</sub></li> <li>Mounting thread N</li> <li>Further designs</li> <li>Add "-Z" to Article No.</li> <li>Acceptance test cert</li> </ul>	1 <sub>16</sub> -20 UNF to IEC 61518 110 to DIN 19213 and specify Order code.	4 5
- Mounting thread <sup>7</sup> / - Mounting thread N Further designs Add "-Z" to Article No. Acceptance test cert Acc. to EN 10204-3.1	16-20 UNF to IEC 61518 110 to DIN 19213 and specify Order code.	4 5 Order code
- Mounting thread M Further designs Add "-Z" to Article No. Acceptance test cert Acc. to EN 10204-3.1 Without process flang	/ <sub>16</sub> -20 UNF to IEC 61518 110 to DIN 19213 and specify Order code. ificate	4 5 Order code
- Mounting thread <sup>7</sup> / - Mounting thread N  Further designs Add "-Z" to Article No.  Acceptance test cert Acc. to EN 10204-3.1  Without process flang Vent on side for gas m  Process flanges, O-r	/ <sub>16</sub> -20 UNF to IEC 61518 110 to DIN 19213  and specify Order code.  ificate  es neasurements <sup>2)</sup> ing, special material	4 5 Order code
- Mounting thread <sup>7</sup> / - Mounting thread M Further designs Add "-Z" to Article No. Acceptance test cert Acc. to EN 10204-3.1 Without process flang Vent on side for gas m Process flanges, O-r Standard: Viton (FKM) Process connection so	/ <sub>16</sub> -20 UNF to IEC 61518 110 to DIN 19213  and specify Order code.  ificate  es neasurements <sup>2)</sup> ing, special material	4 5 Order code
- Mounting thread <sup>7</sup> / - Mounting thread N  Further designs  Add "-Z" to Article No.  Acceptance test cert Acc. to EN 10204-3.1  Without process flang Vent on side for gas m  Process flanges, O-r Standard: Viton (FKN  Process connection so (Teflon), virginal  Process connection so	A <sub>16</sub> -20 UNF to IEC 61518 A10 to DIN 19213  and specify Order code.  ificate  es heasurements <sup>2</sup> ) ing, special material A (FPM)) ealing rings made of PTFE ealing rings made of PTFE	4 5 Order code C12 K00 L32
- Mounting thread <sup>7</sup> / - Mounting thread N  Further designs  Add "-Z" to Article No.  Acceptance test cert Acc. to EN 10204-3.1  Without process flang Vent on side for gas m  Process flanges, O-r Standard: Viton (FKN  Process connection so (Teflon), virginal  Process connection so (Teflon), glass fiber-rei Process connection so	A <sub>16</sub> -20 UNF to IEC 61518 A10 to DIN 19213  and specify Order code.  ificate  es heasurements <sup>2</sup> ) ing, special material A (FPM)) ealing rings made of PTFE ealing rings made of PTFE	C12 K00 L32
- Mounting thread 7/ - Mounting thread M Further designs Add "-Z" to Article No. Acceptance test cert Acc. to EN 10204-3.1 Without process flang Vent on side for gas m Process flanges, O-r Standard: Viton (FKM Process connection so (Teflon), virginal Process connection so (Teflon), glass fiber-rei	A16-20 UNF to IEC 61518 A110 to DIN 19213  and specify Order code.  A code ificate  es  neasurements <sup>2)</sup> ing, special material  A (FPM))  ealing rings made of PTFE  ealing rings made of PTFE  ealing rings made of FFPM	4 5 Order code C12 K00 L32 L60

<sup>1)</sup> Not together with Measuring span "C".

<sup>2)</sup> Only in conjunction with process connection code 4 or 5.

<sup>2)</sup> Not together with Measuring span "G".

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 Accessories/Spare parts

Selection and Ordering data	
	Article No.
Mounting brackets	
For differential pressure transmitters with	
flange thread M10 (7MF5410 and 7MF5450)	
Made of steel	7MF5987-1AA
Made of stainless steel	7MF5987-1AD
Mounting brackets	
for differential pressure transmitter with flange thread 7/16-20 UNF	
(7MF5400 and 7MF5440)	
Made of steel	7MF5987-1AC
Made of stainless steel	7MF5987-1AF
Cover	
Made of die-cast aluminum, including O-ring	
Without window	7MF5987-1BE
• With window	7MF5987-1BF
Digital indicator Including mounting material	7MF5987-1BR
TAG plate (incl. fastening material)	
Without inscription (5 pcs.)	7MF5987-1CA
Printed (1 pc.)	7MF5987-1CB-Z
Data according to Y01 or Y02, Y15 and Y16 (see "SITRANS P transmitters")	Y:
Mounting screws	
For TAG plate, grounding and connection terminals and securing and locking screws (30 units)	7MF5987-1CC
Sealing plugs for process flange	
(1 set = 2 units)	
<ul><li>Made of stainless steel</li><li>Made of Hastelloy</li></ul>	7MF4997-1CG 7MF4997-1CH
Vent valve	71811 4397-1011
Complete (1 set = 2 units)	
Made of stainless steel	7MF4997-1CP
Made of Hastelloy	7MF4997-1CQ
Electronics module	
HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)	7MF5987-1DC
Connection board (incl. fastening material)	
HART, intrinsically safe Ex ia	7MF5987-1DM
for installation in transmitter casing (observe warranty conditions)	7 WI 3307-15 WI
O-rings for process flanges made of:	
<ul><li>Viton (FKM (FPM)) (10 pcs.)</li><li>NBR (Buna N) (10 pcs.)</li></ul>	7MF5987-2DA 7MF5987-2DE
Push buttons assembly (incl. fastening material)	7MF5987-2AF
For replacement of operating keys for onsite operation of the transmitter	
Sealing ring for	
Process connection	See catalog FI01,
NBR sealing ring for screw cover (10 pcs.)	"Fittings" 7MF4997-2EA
NBR sealing ring for interface measuring cell/housing (10 pcs.)	7MF4997-2EB

	Article No.
Operating Instructions <sup>1)</sup>	
German	A5E02344527
English	A5E02344528
French	A5E02344529
Italian	A5E02344530
Spanish	A5E02344531
Compact operating instructions <sup>1)</sup>	
English, German, Spanish, French, Italian, Dutch	A5E02344532
English, Estonian, Latviaan, Lithuanian, Polish, Romanian	A5E02307339
English, Bulgarian, Czech, Finnish, Slovakian, Slovenian	A5E02307340
English, Danish, Greek, Portuguese, Swedish, Hungarian	A5E02307341
Russian	A5E02307338
Brief instructions (Leporello)	
German, English, French, Italian, Spanish, Chinese	A5E02344536
DVD with SITRANS P documentation	
German, English, French, Spanish, Italian Compact operating instructions in 21 EU languages	A5E00090345
Service Instructions <sup>1)</sup> for replacement of electronics, measuring cell and terminal board	
• German	A5E02822443
• English	A5E02344534
HART modem	
With USB interface	7MF4997-1DB
Operating instruction <sup>1)</sup> Supplementary electronics for 4-wire connection	A5E00322799
German, English	
Certificates (order only via SAP) additional to internet download	
<ul><li>Hard copy (to order)</li></ul>	A5E03252406
On DVD (to order)	A5E03252407
1)	f f l

<sup>1)</sup> You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

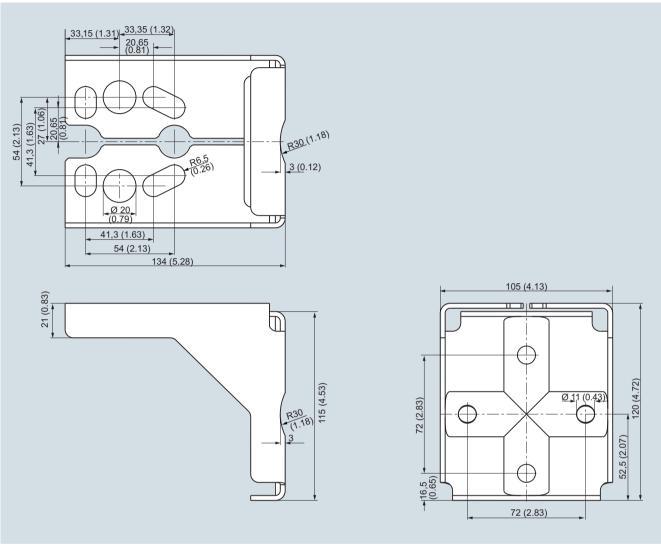
For power supply units, see catalog FI01 "Supplementary Components".

Available ex stock.

Transmitters for applications with highest requirements (Premium)

SITRANS P500 Accessories/Spare parts

## Dimensional drawings



Mounting bracket for SITRANS P pressure transmitter, P500 series, measurements in mm (inch) Mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Transmitters for applications with highest requirements (Premium)

#### SITRANS P500 Factory-mounting of valve manifolds on transmitters

#### Overview

The SITRANS P500 transmitter can be delivered factory-fitted with the following manifolds:

- Valve manifolds 7MF9411-5BA: Three valve manifold for differential pressure transmitter
- Valve manifolds 7MF9411-5CA: Three valve manifold for differential pressure transmitter

### Design

The 7MF9411-5BA and 7MF9411-5CA manifolds are sealed with PTFE sealing rings between the transmitter and the manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (2411 in $H_2O$ )) and is certified leak-proof with a test report to EN 10204 - 2.2.

All manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of manifolds", you will receive a mounting bracket for the manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of manifolds", a separate certificate is provided for the transmitters and the manifolds respectively.

#### Selection and ordering Data

# Manifold 7MF9411-5BA on SITRANS P pressure transmitter P500 for differential pressure and flow



Add -Z to the Article No. of the transmitter and add Order codes	Order code
SITRANS P500 7MF54	
mounted with gaskets made of PTFE and screws made of	
Chromized steel	U01
• Stainless steel	U02
Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• Steel	A01
• Stainless steel	A02
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	C12

# Manifold 7MF9411-5CA on SITRANS P500 pressure transmitter for differential pressure and flow



Add -Z to the Article No. of the transmitter and add Order codes	Order code
SITRANS P500 7MF54	
mounted with gaskets made of PTFE and screws made of	
Chromized steel	U03
• Stainless steel	U04
Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• Steel	A01
• Stainless steel	A02
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	C12

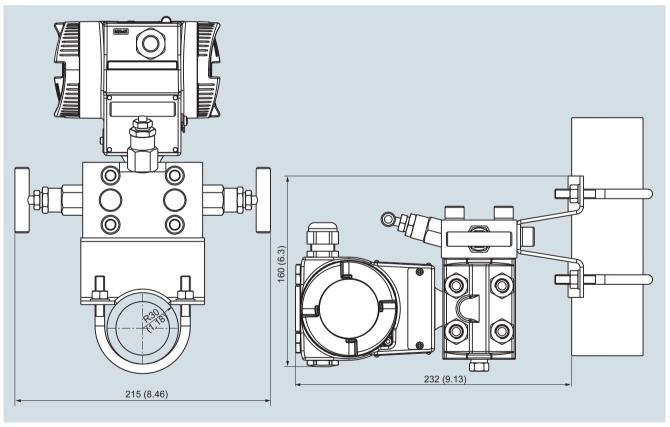
Transmitters for applications with highest requirements (Premium)

SITRANS P500 Factory-mounting of valve manifolds on transmitters

## Dimensional drawings



Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



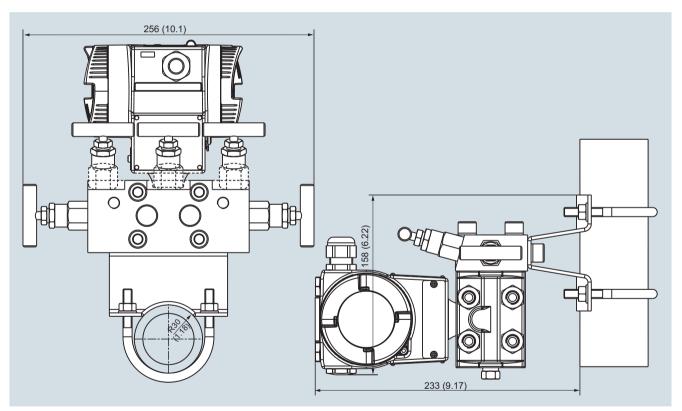
Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

Transmitters for applications with highest requirements (Premium)

### SITRANS P500 Factory-mounting of valve manifolds on transmitters



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

#### Remote seals for transmitters and pressure gauges

#### **Technical description**

#### Overview

In many cases the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the following SITRANS P pressure transmitter series:

- Pressure (P300, DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus)
- Absolute pressure (P300, DS III with HART, DS III with PROFIBUS PA. DS III with FOUNDATION Fieldbus)
- Differential pressure and flow (P500, DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus)

#### Note

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical data". Only then will the remote seal work to optimum effect.

#### Benefits

- No direct contact between the pressure transmitter and the medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- · Available in many versions
- Specially designed for difficult operating conditions
- · Quick-release versions available for the food industry

#### Application

Remote seal systems should be used if a separation between the measured medium and the measuring instrument is essential or appropriate.

Examples of such cases:

- The temperature of the medium is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials which are not available for the pressure transmitter.
- The medium is highly viscous or contains solids which would block the measuring chambers of the pressure transmitter.
- The medium may freeze in the measuring chambers or pulse line.
- The medium is heterogeneous or fibrous.
- The medium tends towards polymerization or crystallization.
- The process requires quick-release remote seals, as necessary e.g. in the food industry for fast cleaning.
- The process requires cleaning of the measuring point, e.g. in a batch process.

#### Design

A remote seal system consists of the following components.

- · Pressure transmitter
- One or two remote seals
- · Filling liquid
- Connection between pressure transmitter and remote seal (direct mounting or by means of capillary)

The volume in contact with the measured medium is terminated by a flat elastic diaphragm lying in a bed. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary has to be connected between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects on the latter when hot media are involved.

However, the capillary influences the response time and the temperature response of the complete remote seal system. Two capillaries of equal length must always be used to connect a remote seal to a pressure transmitter for differential pressure.

The remote seal can be optionally equipped with a projecting diaphragm (tube).

Remote seals of sandwich design are fitted with a dummy flange.

#### Designs

#### Diaphragm seal

With diaphragm seals, the pressure is measured by means of a flat diaphragm which rests in a bed.

The following types of diaphragm seals exist:



Diaphragm seal of sandwich design without (left) and with a projecting diaphragm (tube)

- Sandwich design
- Sandwich design with projecting diaphragm (tube) to DIN or ASME which are secured using a dummy flange.



Diaphragm seal of flange design without (left) and with a projecting diaphragm (tube)

- Flange design
- Flange design with projecting diaphragm (tube) to DIN or ASME, secured using holes in the flange.



Quick-release diaphragm seal

- Quick-release remote seals, e.g. to DIN 11851, SMS standard, IDF standard, APV RJF standard, clamp connection, etc.
- Miniature diaphragm seal with male thread for screwing into tapped holes
- Remote seals with customer-specific process connections

Remote seals for transmitters and pressure gauges

#### **Technical description**



Miniature diaphragm seal with diaphragm flush with front

· Miniature diaphragm seals

The quick-release remote seals are used above all in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismounting is possible for cleaning.

#### Clamp-on seal



Clamp-on seal with quick-release design (left) and for flange mounting

With clamp-on seals, the pressure is first measured using a cylindrical diaphragm positioned in a pipe, and then transmitted to the pressure transmitter by means of the filling liquid.

The clamp-on seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. Furthermore, the clamp-on seal can be cleaned by a pig.

The following types of clamp-on seals exist:

- Quick-release clamp-on seals, e.g. to DIN 11851, SMS standard, IDF standard, APV/RJF standard, clamp connection etc.
  The quick-release facility attached to the remote seal enables the seal to be removed quickly for cleaning purposes.
- Clamp-on seals for flanging to EN or ASME.
- Clamp-on seals with customer-specific process connections.

#### Note:

The pressure data on the transmitter and the remote seal must be observed with regard to pressure/temperature behavior.

#### Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the transmitter, are filled gas-free by the filling liquid.

#### Transmission response

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

#### Temperature error

Temperature errors are caused by the change of volume of the filling liquid due to temperature variations. To select the right remote seal you must calculate the temperature error.

Below you will find an overview of the factors which influence the size of the temperature error, as well as information on how to calculate the temperature error.

The temperature error is dependent on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Influence of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Internal diameter of the capillary: The bigger the internal diameter, the bigger the temperature error
- Length of the capillary: The longer the capillary, the bigger the temperature error

#### Diaphragm rigidity

The rigidity of the diaphragm is of decisive importance. The bigger the diameter of the diaphragm, the softer the diaphragm and the more sensitively it reacts to temperature-induced changes in volume of the filling liquid.

The result is that small measuring ranges are only possible with large diaphragm diameters.

Other factors apart from diaphragm rigidity which also play a role:

- Diaphragm thickness
- Diaphragm material
- · Coatings if present

#### Filling liquid

Every filling liquid reacts to temperature variations with a change of volume. Temperature errors can be minimized by selecting a suitable filling liquid, but the filling liquid must also be appropriate for the temperature limits and operating pressure. Furthermore, the filling liquid must also be physiologically harmless.

Since the filling liquid is present under the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank), the temperature error must be calculated separately for each combination.

#### Note

A vacuum-resistant remote seal is recommended for continuous low-pressure operation at 500 mbar a or below, including during commissioning (see ordering data).

An example of a temperature error calculation can be found in the section "Technical Specifications".

Remote seals for transmitters and pressure gauges

**Technical description** 

#### Response time

The response time is dependent on the following factors:

- Internal diameter of the capillary: The bigger the internal diameter, the shorter the response time
- Viscosity of the filling liquid The greater the viscosity, the longer the response time
- Length of the capillary: The longer the capillary, the longer the response time
- Pressure in the pressure measuring system: The higher the pressure, the shorter the response time

#### Recommendations

The following should be observed to obtain an optimum combination of transmitter and remote seal:

- Choose the biggest possible diameter for the remote seal. The
  effective diameter of the seal diaphragm is then bigger and
  the temperature error smaller.
- Choose the shortest possible capillary. The response time is then shorter and the temperature error smaller
- Choose the filling liquid with the least viscosity and the smallest coefficient of expansion. Make sure, however, that the filling liquid meets the process requirements with regard to pressure, vacuum and temperature. And ensure that the filling liquid and the medium are compatible with one another.
- Note the following points for use in the vacuum range:
  - The pressure transmitter must always be positioned below the lowest spigot.
  - The operating range of some filling liquids is very limited with regard to the permissible temperature of the medium.
  - A vacuum-proof seal is necessary for continuous operation in the low-pressure range.
- Recommendations for the minimum span can be found in the section "Technical data".

#### Note

The remote seals listed here are a selection of the most common designs. On account of the large variety of process connections, certain remote seals which are not listed here may be available nevertheless.

Other versions can be:

- Other process connections, standards
- · Aseptic or sterile connections
- · Other dimensions
- · Other nominal pressures
- · Special diaphragm materials, including coatings
- · Other sealing faces
- Other filling liquids
- Other capillary lengths
- Sheathing of capillaries with protective hose
- Calibration at higher/lower temperatures etc.

Please contact your local Siemens office for further information.

#### Negative pressure service

Liquids, such as silicone oils, inert or those suitable for food, are used in remote seal systems for transmission of the process pressure to the pressure transmitter.

In each liquid, particles have the tendency to leave the liquid compound with increasing temperature (transition from liquid to gaseous aggregate state). This means the vapor pressure increases with increasing temperature and is dependent on the substance or mixture being present.

The higher the temperature and the lower the associated process pressure in the liquid, the more difficult it gets to guarantee the desired transmission properties of the fill fluid and therefore the measuring arrangement.

Plus the sealing elements at the transmitter must be designed so that a diffusion of molecules from the atmosphere into the remote seal system is prevented due to the constantly occurring negative pressure.

In addition to the influencing variables process pressure and process temperature, the vapor pressure curve of the fill fluid at the remote seal end and the stiffness of the remote seal membrane impact the functionality of the remote seal in the negative pressure range.

This means you have to pay special attention to the physical properties of fill fluids with applications in the negative pressure range.

There are three stages for the negative pressure resistance:

- Standard design of the remote seal without additional protective measures, suitable for the overpressure range and low negative pressure range. This design is identified with (1) in the diagrams below in section 3.
- Negative pressure service with suitable seals and treated fill fluid, identified with (2) in the diagrams below in section 3.
   Here you select the order codes V01, V03 or V04, depending on the mounting type.
- Extended negative pressure service with more extended treatment of the fill fluid and the remote seals, identified in the diagrams below. Here you select the order codes V51, V53 or V54, depending on the mounting type.

There are two more areas in the diagrams. The area (4) identifies an area that has to be clarified with Technical Support prior to placing the order. The area (5) describes the area in which the remote seal fill fluid is permanently destroyed and the entire remote seal is therefore without function.

Remote seals for transmitters and pressure gauges

#### **Technical description**

Technical specifications of the remote seal filling liquids

Filling liquid	Num- ber in the Article No.	Density at 20°C [kg/dm <sup>3</sup> ]	Visco- sity at 20°C [mm <sup>2</sup> /s]	Suitable for nega- tive pres- sure service	Suitable for exten- ded nega- tive pressure service
Silicone oil M5	1	0,914	4	Х	-
Silicone oil M50	2	0,966	50	Х	х
High-tempera- ture oil	3	1,070	57	Х	Х
Halocarbon oil	4	1,968	14	Х	-
Food oil (FDA-listed)	7	0,920	10	X	X

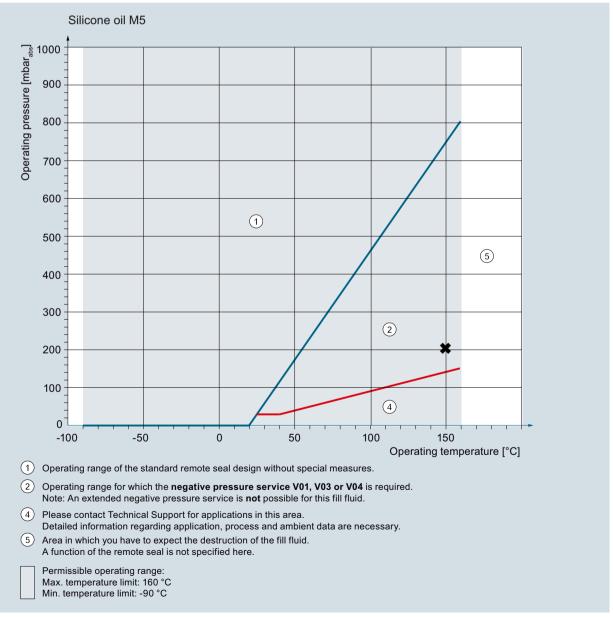
The suitable negative pressure service is specified with the pressure/temperature curves of the respective liquids described below.

**Note:** For reasons of operational safety, the transmitter must not exceed the height of the remote seal - with differential pressure applications, the height of the bottom remote seal - for measurements in the negative pressure range. The associated installation types B, C1, C2 or H are described at the end of this section under the topic "Measuring arrangements".

#### Selection of the required negative pressure service

The procedure for determining the required negative pressure service is described below using the silicone oil M5 as fill fluid. The minimum existing process pressure of a fictitious process is 200 mbar<sub>abs</sub> (2.9 psi) (at a maximum process temperature of 150 °C (302 °F)). This intersection is identified by an "**\***" in the diagram below. This means the negative pressure service V01, V03 or V04 (depending on the application) is sufficient in this example.

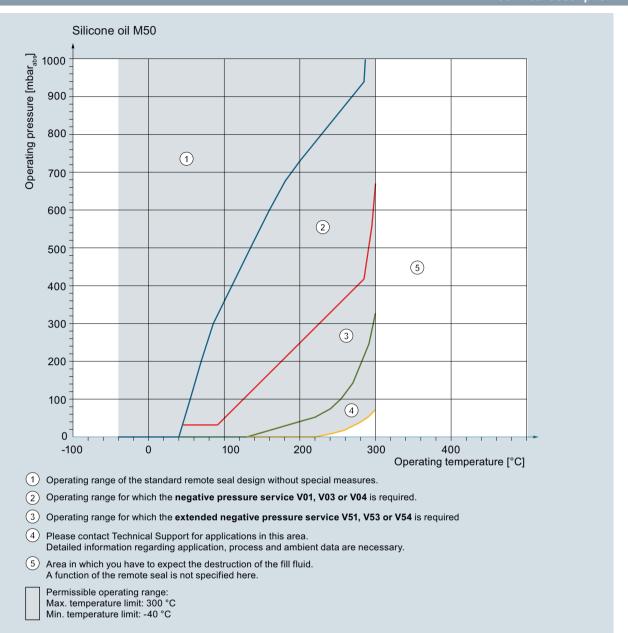
The suitable negative pressure resistance is determined this way for all other fill fluids.



Negative pressure applications with silicone oil M5

Remote seals for transmitters and pressure gauges

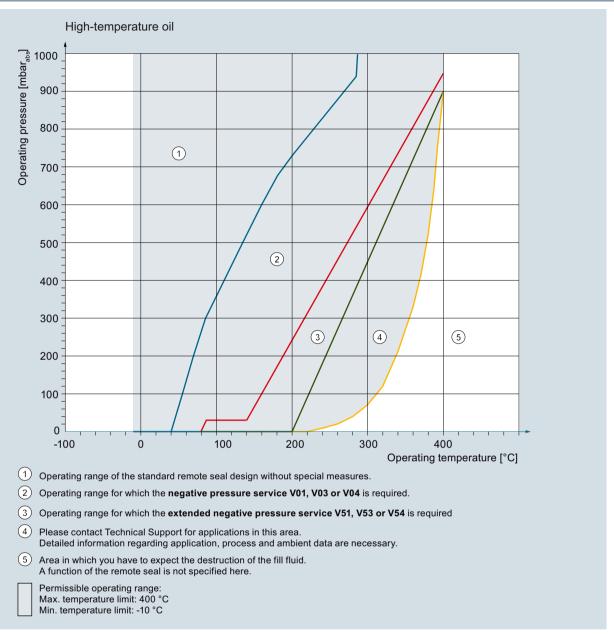
**Technical description** 



Negative pressure applications with silicone oil M50

Remote seals for transmitters and pressure gauges

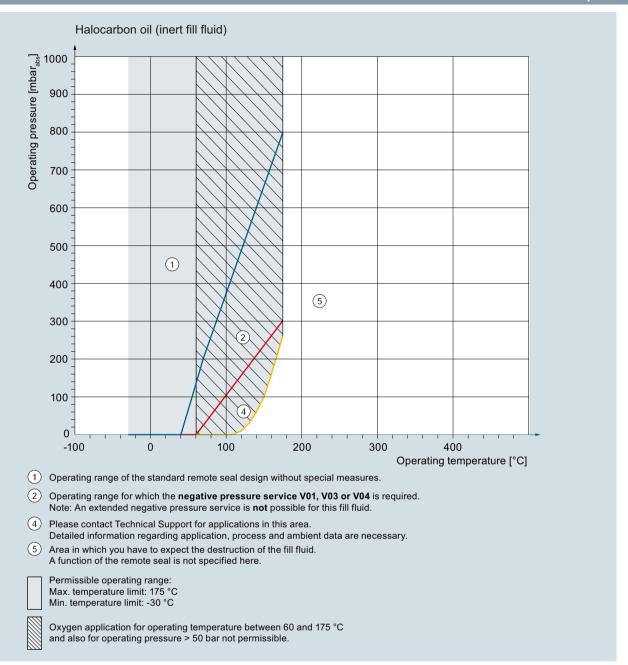
### **Technical description**



Negative pressure applications with high-temperature oil

Remote seals for transmitters and pressure gauges

**Technical description** 

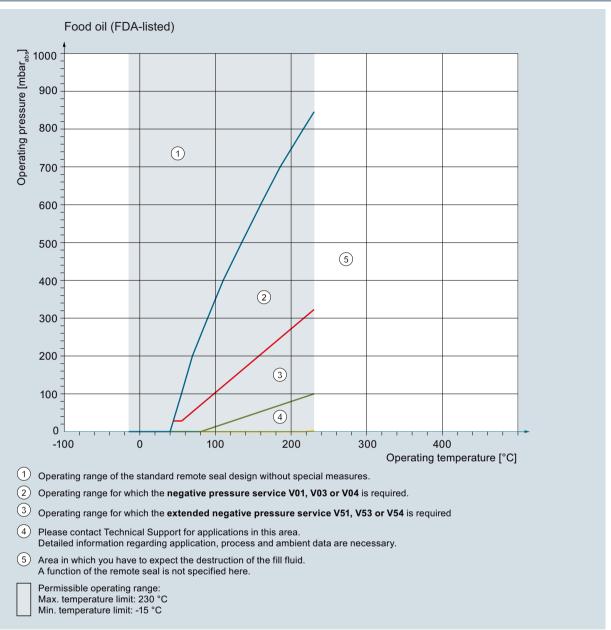


Negative pressure applications with halocarbon oil (inert filling liquid)

A BAM approval for process temperatures up to  $60 \,^{\circ}$ C ( $140 \,^{\circ}$ F) and system pressures up to  $50 \, \text{bar}$  ( $725 \, \text{psi}$ ) is available for the oxygen application.

Remote seals for transmitters and pressure gauges

### **Technical description**



Negative pressure applications with food oil (FDA listed)

Remote seals for transmitters and pressure gauges

Technical description

### Technical specifications Temperature error Diaphragm seals

Temperature errors of diaphragm seals when connected to pressure transmitters for pressure, absolute pressure, differential pressure (single-sided) and level

	Nominal diameter/ design		diameter e		Diaphragm Temperature diameter error of remote seal f <sub>RS</sub>		Temperature of capillary f <sub>Cap</sub>	Temperature error of capillary f <sub>Cap</sub>		Temperature error of process flange/connec- tion spigot f <sub>PF</sub>		Recommended min. spans (guid- ance values, observe temp. error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K ⋅ m <sub>Cap</sub> )	(psi/ (10 K · m <sub>Cap)</sub> ))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)		
Sandwich	DN 50 without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)		
design or with lange to	DN 50 with tube	45	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)		
EN 1092-1	DN 80 without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)		
	DN 80 with tube	72	(2.83)		(0.015)	1	(1.015)	1	(1.015)	250	(3.63)		
	DN 100 without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)		
	DN 100 with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)		
	DN 125 without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)		
	DN 125 with tube	124	(4.88)		(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)		
Sandwich	2 inch without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)		
design or with	2 inch with tube	45	(1.89)		(0.073)	10	(0.145)	10	(0.145)	500	(7.25)		
lange to ASME B16.5	3 inch without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)		
101112 2 1010	3 inch with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)		
	4 inch without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)		
	4 inch with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)		
	5 inch without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)		
	5 inch with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)		
Remote seal	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)		
vith union nut to DIN 11851	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)		
JIIV 11001	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)		
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)		
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)		
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)		
Remote seal, screwed gland design	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)		
Remote seal	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)		
vith threaded socket to	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)		
DIN 11851	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)		
	DN 50	52	(2.05)		(0.058)	5	(0.073)	5	(0.073)	500	(7.25)		
	DN 65	59	(2.32)		(0.044)	4	(0.058)	4	(0.058)	500	(7.25)		
	DN 80	72	(2.83)		(0.015)	1	(0.015)	1	(0.015)	250	(3.63)		
Clamp connection	1½ inch	32	(1.26)		(0.116)	25	(0.363)	25	(0.363)	4000	(58)		
IOI I	2 inch	40	(1.57)		(0.058)	10	(0.145)	10	(0.145)	2000	(29)		
	2½ inch	59	(2.32)		(0.044)	5	(0.073)	5	(0.073)	500	(7.25)		
	3 inch	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)		
Miniature dia- hragm seal	G1B	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)		
magin scai	G11/2B	40	(1.57)		(0.058)	10	(0.145)	10	(0.145)	2000	(29)		
	G2B	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)		

### Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
  Values apply to stainless steel as the diaphragm material.

Remote seals for transmitters and pressure gauges

### **Technical description**

Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)

	Nominal diameter/ design	Diaphra diamete		of remote seal f <sub>RS</sub>		·		Temperature error of process flange/connection spigot f <sub>PF</sub>		Recommended min. spans (guidance val- ues, observe temperature error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K ⋅ m <sub>Cap</sub> )	(psi/ (10 K · m <sub>Cap</sub> ))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)
Sandwich	DN 50 without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0045)	0.3	(0.0045)	250	(3.626)
design or with flange to	DN 50 with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
EN 1092-1	DN 80 without tube	89	(3.50)	0.05	(0.001)	0.05	(0.001)	0.05	(0.0007)	50	(0.725)
	DN 80 with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	DN 100 without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 100 with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 125 without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Sandwich	2 inch without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0043)	0.3	(0.0045)	250	(3.626)
design with flange to	2 inch with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
ASME B16.5	3 inch without tube	89	(3.50)	0.05	(0.001)	0.05	(0.0007)	0.05	(0.0007)	50	(0.725)
	3 inch with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	4 inch without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	4 inch with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	5 inch without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	5 inch with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Remote seal, screwed gland design	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
Remote seal	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
with union nut to DIN 11851	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Remote seal	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
with threaded socket to	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
DIN 11851	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Clamp connec-	2 inch	40	(1.57)	1	(0.015)	2.5	(0.036)	2.5	(0.036)	2000	(29.01)
tion	2½ inch	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	3 inch	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)

#### Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Values apply to stainless steel as the diaphragm material.

Remote seals for transmitters and pressure gauges

**Technical description** 

#### Temperature error Clamp-on seals

Temperature errors of clamp-on seals when connected to pressure transmitters for gauge pressure and absolute pressure, and with single-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	Temperature error of remote seal f <sub>RS</sub>		capillary f <sub>Cap</sub>		Temperature error of pro- cess flange/connection spigot f <sub>PF</sub>		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K (psi/10 K)		mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	6.0	(0.0870)	8.5	(0.123)	8.5	(0.123)	1000	(14.5)
DN 40 (1½ inch)	4.5	(0.065)	4.5	(0.065)	4.5	(0.065)	250	(3.63)
DN 50 (2 inch)	4.0	(0.058)	3.0	(0.044)	3.0	(0.044)	100	(1.45)
DN 80 (3 inch)	9.5	(0.138)	5.0	(0.073)	5.0	(0.073)	100	(1.45)
DN 100 (4 inch)	8.0	(0.012)	3.0	(0.044)	3.0	(0.044)	100	(1.45)

Temperature errors of clamp-on seals with double-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	neter/ Temperature error of remote seal f <sub>RS</sub>				Temperature error of process flange/connection spigot f <sub>PF</sub>		Property of the property of th	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	2.3	(0.033)	1.8	(0.026)	1.8	(0.026)	1000	(14.5)
DN 40 (1½ inch)	0.8	(0.012)	0.3	(0.004)	0.3	(0.004)	250	(3.63)
DN 50 (2 inch)	0.3	(0.004)	0.1	(0.002)	0.1	(0.002)	100	(1.45)
DN 80 (3 inch)	3.0	(0.044)	0.5	(0.007)	0.5	(0.007)	100	(1.45)
DN 100 (4 inch)	1.0	(0.015)	0.1	(0.002)	0.1	(0.002)	100	(1.45)

#### Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Half the values apply to glycerin/water mixture as the filling liquid.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness 0.05 mm (0.002 inch) for DN 25/DN 40/DN 50 and 0.1 mm (0.004 inch) for DN 80/DN 100

Remote seals for transmitters and pressure gauges

#### **Technical description**

#### Calculation of the temperature error

The following equation is used to calculate the temperature error:

$dp = (\vartheta_RS - \vartheta_Cal) \cdot f_RS + (\vartheta_Cap - \vartheta_Cal) \cdot I_Cap \cdot f_Cap + (\vartheta_TR - \vartheta_Cal) \cdot f_PF$									
dp	Additional temperature error (mbar)								
$\theta_{RS}$	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)								
9 <sub>Cal</sub>	Calibration (reference) temperature (20 °C (68 °F))								
f <sub>RS</sub>	Temperature error of remote seal								
θ <sub>Cap</sub>	Ambient temperature on the capillaries								
Ican	Capillary length								

Temperature error of capillaries

flanges of the pressure transmitter

Ambient temperature on pressure transmitter

Temperature error of the oil filling in the process

#### Example of temperature error calculation

#### Existing conditions:

f<sub>Cap</sub>

 $f_{PF}$ 

Existing conditions.	
SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 100 mbar, with DN 100 remote seal diaphragms without tube, diaphragm made of stainless steel, mat. No. 1.4404/316L	f <sub>RS</sub> = 0.05 mbar/10 K (0.039 inH <sub>2</sub> O/10 K)
Capillary length	$I_{Cap} = 6 \text{ m (19.7 ft)}$
Capillaries fitted on both sides	$f_{Cap} = 0.07 \text{ mbar/(10 K} \cdot m_{Cap})$ (0.028 inH <sub>2</sub> O/(10 K · m <sub>Cap</sub> ))
Filling liquid silicone oil M5	f <sub>PF</sub> = 0.07 mbar/10 K (0.028 inH <sub>2</sub> O/10 K)
Process temperature	θ <sub>RS</sub> = 100 °C (212 °F)
Temperature on the capillaries	θ <sub>Cap</sub> = 50 °C (122 °F)
Temperature on pressure transmitter	9 <sub>TR</sub> = 50 °C (122 °F)
Calibration temperature	θ <sub>Cal</sub> = 20 °C (68 °F)

#### Required:

Additional temperature error of remote seals: dp

#### Calculation:

#### in mbar

 $dp = (100 \, ^{\circ}\text{C} - 20 \, ^{\circ}\text{C}) \cdot 0.05 \, \text{mbar/10 K} + (50 \, ^{\circ}\text{C} - 20 \, ^{\circ}\text{C}) \cdot 6 \, \text{m} \cdot 0.07 \, \text{mbar/(10 K} \cdot \text{m}) + (50 \, ^{\circ}\text{C} - 20 \, ^{\circ}\text{C}) \cdot 0.07 \, \text{mbar/10 K}$   $dp = 0.4 \, \text{mbar} + 1.26 \, \text{mbar} + 0.21 \, \text{mbar}$ 

#### in inH<sub>2</sub>O

 $dp = (212 \text{ °F} - 68 \text{ °F}) \cdot 0.039 \text{ inH}_2\text{O}/10 \text{ K} + (112 \text{ °F} - 68 \text{ °F}) \cdot 19.7 \text{ ft} \\ 0.028 \text{ inH}_2\text{O}/(10 \text{ K} \cdot 3.28 \text{ ft}) + (112 \text{ °F} - 68 \text{ °F}) \cdot (0.028 \text{ inH}_2\text{O}/10 \text{ K}) \\ dp = 0.16 \text{ inH}_2\text{O} + 0.51 \text{ inH}_2\text{O} + 0.08 \text{ inH}_2\text{O}$ 

#### Result:

#### $dp = 1.87 \text{ mbar } (0.75 \text{ inH}_2\text{O})$

(corresponds to 2.27% of set span)

#### Note

The determined temperature error only applies to the error resulting from connection of the remote seal.

The transmission response of the respective transmitter is  $\underline{\text{not}}$  included in this consideration.

It must be calculated separately, and the resulting error <u>added</u> to the error determined above from connection of the remote seal.

#### Dependence of temperature error on diaphragm material

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

Diaphragm material	Change in temperature error of remote seal
	Increase in values by
Stainless steel, Duplex,	See previous tables
Hastelloy C4, mat. No. 2.4610	50 %
Hastelloy C276, mat. No. 2.4819	50 %
Monel 400, mat. No. 2.4360	60 %
Tantalum	50 %
Titanium	50 %
PTFE coating on stainless steel diaphragm	80 %
ECTFE coating or PFA coating on stainless steel diaphragm	100 %
Gold coating on stainless steel dia- phragm	40 %
Inconel	50 %
Incoloy	50 %

#### Maximum temperature of medium

The following maximum temperatures of the medium apply depending on the material of the wetted parts:

Material	p <sub>abs</sub> < 1 k (402 inH <sub>2</sub>		p <sub>abs</sub> > 1 bar (402 inH <sub>2</sub> O)		
	°C	(°F)	°C	(°F)	
Stainless steel, 316L	200	(392)	400	(662)	
PTFE coating	200	(392)	260	(500)	
ECTFE coating	On reque	st	150	(302)	
PFA coating	200	(392)	260	(500)	
Hastelloy C4, mat. No. 2.4610	200	(392)	260	(500)	
Hastelloy C276, mat. No. 2.4819	200	(392)	400	(662)	
Monel 400, mat. No. 2.4360	200	(392)	400	(662)	
Tantalum	200	(392)	300	(572)	
Duplex, mat. No. 1.4462	200	(392)	300	(572)	
Titanium	100	(212)	150	(302)	
Inconel	200	(392)	400	(752)	
Incoloy	200	(392)	400	(752)	
Gold coating	200	(392)	400	(752)	

# Maximum capillary length for diaphragm seals (guidance values)

	•								
Nom. diam.		Max. length of capillary							
		Diaphragi	n seal	Clamp-on	seal				
			(ft)	m	(ft)				
DN 25	(1 inch)	2.5	(8.2)	2.5	(8.2)				
DN 32	(11/4 inch)	2.5	(8.2)	2.5	(8.2)				
DN 40	(1½ inch)	4	(13.1)	6	(19.7)				
DN 50	(2 inch)	6	(19.7)	10	(32.8)				
DN 65	(2½ inch)	8	(26.2)	10	(32.8)				
DN 80	(3 inch)	15	(49.1)	10	(32.8)				
DN 100	(4 inch)	15	(49.1)	10	(32.8)				
DN 125	(5 inch)	15	(49.1)	-	-				

Remote seals for transmitters and pressure gauges

**Technical description** 

#### Response times

The values listed in the following table are the response times (in seconds per meter of capillary) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary, or with transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set span within the range of the respective transmitter. The response times are of insignificant importance for spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. span of pressure transmitter					
	kg/dm <sup>3</sup>	(lb/in <sup>3</sup> )	°C	(°F)	250 mbar	(101 inH <sub>2</sub> O)	600 mbar	(241 inH <sub>2</sub> O)	1600 mbar	(643 inH <sub>2</sub> O)
Silicone oil M5	0.914	(0.033)	+60	(140)	0.06	(0.018)	0.02	(0.006)	0.01	(0.003)
			+20	(68)	0.11	(0.034)	0.02	(0.006)	0.02	(0.006)
			- 20	(-4)	0.3	(0.091)	0.12	(0.037)	0.05	(0.015)
Silicone oil M50	0.966	(0.035)	+60	(140)	0.6	(0.183)	0.25	(0.076)	0.09	(0.027)
			+20	(68)	0.61	(0.186)	0.26	(0.079)	0.1	(0.030)
			- 20	(-4)	1.69	(0.515)	0.71	(0.216)	0.27	(0.082)
High-temperature oil	1.070	(0.039)	+60	(140)	0.14	(0.043)	0.06	(0.018)	0.02	(0.006)
			+20	(68)	0.65	(0.198)	0.27	(0.082)	0.1	(0.030)
			-10	(14)	3.96	(1.207)	1.65	(0.503)	0.62	(0.189)
Halocarbon oil	1.968	(0.071)	+60	(140)	0.07	(0.021)	0.03	(0.009)	0.01	(0.003)
			+20	(68)	0.29	(0.088)	0.12	(0.037)	0.05	(0.015)
			- 20	(-4)	2.88	(0.878)	1.2	(0.366)	0.45	(0.137)
Food oil (FDA listed)	0.920	(0.033)	+60	(140)	0.75	(0.229)	0.33	(0.101)	0.17	(0.052)
			+20	(68)	4	(1.220)	1.75	(0.534)	0.67	(0.204)
			- 20	(-4)	20	(6.100)	8.5	(2.593)	3.25	(0.991)

Permissible data of filling liquids for pressure and temperature see diagrams on page 1/270 ff.

Remote seals for transmitters and pressure gauges

### Diaphragm seals of sandwich design with flexible capillary

### Overview



Diaphragm seals of sandwich design

Technical specifications			
Diaphragm seals of sandwich design		Sealing material in the process	
Nominal diameter	Nominal pressure	flanges	
• DN 50	PN 16 PN 400	<ul> <li>For pressure transmitters, absolute pressure transmitters and low-pressure applications</li> </ul>	Copper
• DN 80	PN 16 PN 400		
• DN 100	PN 16 PN 400	<ul> <li>For other applications</li> </ul>	Viton
• DN 125	PN 16 PN 400		
• 2 inch	Class 150 class 2500	Maximum pressure	See above and the technical data of the pressure transmitters
• 3 inch	Class 150 class 2500	Tube length	Without tube as standard (tube
• 4 inch	Class 150 class 2500	rabo rengari	available on request)
• 5 inch	Class 150 class 2500	Capillary	
Sealing face		• Length	Max. 10 m (32.8 ft), longer lengths
<ul> <li>For stainless steel, mat. No. 1.4404/316L</li> </ul>	To EN 1092-1, form B1 or ASME B16.5 RF 125 250 AA	Internal diameter	on request max. 2 mm (0.079 inch)
For the other materials	To EN 1092-1, form B2 or	Minimum bending radius	150 mm (5.9 inch)
	ASME B16.5 RFSF	Filling liquid	Silicone oil M5
Materials		5 1	Silicone oil M50
Main body	Stainless steel mat. no. 1.4404/316L		High-temperature oil
<ul> <li>Wetted parts</li> </ul>	Stainless steel mat. no. 1.4404/316L		Halocarbon oil (for measuring O <sub>2</sub> )
	Without coating		Food oil (FDA listed)
	<ul> <li>PTFE coating</li> <li>ECTFE coating (for vacuum on request)</li> <li>PFA coating</li> <li>Monel 400, mat. No. 2.4360</li> <li>Hastelloy C276, mat. No. 2.4819</li> <li>Hastelloy C4, mat. No. 2.4610</li> <li>Hastelloy C22, mat. no. 2.4602</li> </ul>	Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
			More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
	Tantalum	Weight	Approx. 4 kg (8.82 lb)
	Titanium, mat. no. 3.7035	Certificate and approvals	
	Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, thickness approx. 25 μm	Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Capillary	Stainless steel, mat. No. 1.4571/316Ti		
• Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/304		

### Remote seals for transmitters and pressure gauges

## Diaphragm seals of sandwich design with flexible capillary

Selection and Ordering data	Article No.	Ord.code
Diaphragm seal		
Sandwich-type design, with flexible connected to a SITRANS P transmit (order separately):		
for pressure 7MF403 and 7MF4 together with Order code "V01" (Ne sure service) and 7MF802 <sup>1)</sup> ; Scope of delivery (1 off)	7 M F 4 9 0 0 gative pres-	0 -
for absolute pressure 7MF433 Scope of delivery (1 off)	7 M F 4 9 0 1	1 -
for differential pressure and flow and 7MF54; scope of delivery 2		3 -
Click on the Article No. for the or ration in the PIA Life Cycle Porta		В
Nominal diameter and nominal pr		
• DN 50 PN 16 400	A	
(recommended only for pressure tra for pressure)	ansmillers	
• DN 80 PN 16 400	В	
• DN 100 PN 16 400	С	
DN 125 PN 16 400	D	
• 2 inch Class 150 2	2500 <b>E</b>	
recommended only for pressure tra	ansmitters	
for pressure)		
• 3 inch Class 150 2		
• 4 inch Class 150 2		
• 5 inch Class 150 2		
Smooth sealing face to EN 1092-1, to ASME B16.5 RF 125 250 AA	IOIIII D I OI	
Other version	Z	J 1 Y
Add Order code and plain text: Nominal diameter:; Nominal pres Sealing face: see "Technical data"	sure:	
Wetted parts materials		
Stainless steel 316L		
- without coating	A	
- with PTFE coating <sup>2)</sup>	E 0	
- with ECTFE coating 2) 3)	F	
- with PFA coating 2)	D	
Monel 400, mat. No. 2.4360	G	
Hastelloy C276, mat. No. 2.4819	J	
Hastelloy C4, mat. No. 2.4610	U O	
Hastelloy C22, mat. No. 2.4602	V 0	
• Tantalum • Titanium, mat. No. 3.7035 (max. 1	50 °C	
(302 °F))		
Nickel 201 (max. 260 °C (500 °F))	M 0	
Duplex 2205, mat. no. 1.4462	Q	
D   000E   14400 '	•	
•	S O	
• Stainless steel 316L, gold plated,	30	
• Stainless steel 316L, gold plated, thickness approx. 25 μm		
• Stainless steel 316L, gold plated, thickness approx. 25 μm Tube length		
Tube length  • without tube	0	<b>V</b> 1 V
• Stainless steel 316L, gold plated, thickness approx. 25 μm Tube length		K1 Y

Selection and Ordering data	Article N	o. Ord.code	
Diaphragm seal			
Sandwich-type design, with fle connected to a SITRANS P tran (order separately):			
for pressure 7MF403 and 7 together with Order code "V01" sure service) and 7MF802 <sup>1</sup> Scope of delivery (1 off)	7 M F 4 9	00-	
for absolute pressure 7MF433 Scope of delivery (1 off)	3;	7 M F 4 9	01-
for differential pressure and f and 7MF54; scope of delive		7 M F 4 9	03-
		1====	- B
Customer-specific tubus leng	gth		
Specify customer-specific leng Order Code	th with Y44, see		
Wetted parts materials: Stainle			
Range	Standard length		
20 50 mm (0.79 1.97")	50 mm (1.97")	A 1	
51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	100 mm (3.94") 150 mm (5.91")	A 2 A 3	
151 200 mm (5.94 7.87")	200 mm (7.87")	A 4	
201 250 mm (7.91 9.84")	250 mm (9.84")	A 5	
Wetted parts materials: Stainle with ECTFE	ess steel coated		ш
Range	Standard length		
20 50 mm (0.79 1.97")	50 mm (1.97")	F 1	
51 100 mm (2.01 3.94")	100 mm (3.94")	F 2	
101 150 mm (3.98 5.91")	150 mm (5.91")	F 3	
151 200 mm (5.94 7.87")	200 mm (7.87")	F 4 F 5	
<ul><li>201 250 mm (7.91 9.84")</li><li>Wetted parts materials: Stainle</li></ul>	250 mm (9.84") ess steel coated	F 5	
with PFA	Standard length		
Range		D 1	
20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94")	50 mm (1.97") 100 mm (3.94")	D 1 D 2	
101 150 mm (3.98 5.91")	150 mm (5.91")	D 3	
151 200 mm (5.94 7.87")	200 mm (7.87")	D 4	
201 250 mm (7.91 9.84")	250 mm (9.84")	D 5	
Wetted parts materials: Monel			
Range	Standard length		
20 50 mm (0.79 1.97")	50 mm (1.97")	G 1	
51 100 mm (2.01 3.94")	100 mm (3.94")	G 2	
101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	150 mm (5.91") 200 mm (7.87")	G 3 G 4	
Wetted parts materials: Hastel	l .	44	
Range	Standard length		
20 50 mm (0.79 1.97")	50 mm (1.97")	J 1	
51 100 mm (2.01 3.94")	100 mm (3.94")	J 2	
101 150 mm (3.98 5.91")	150 mm (5.91")	J 3	
151 200 mm (5.94 7.87")	200 mm (7.87")	J 4	
Wetted parts materials: Tantali			
Range	Standard length		
20 50 mm (0.79 1.97")	50 mm (1.97")	K1	
51 100 mm (2.01 3.94")	100 mm (3.94")	K2	
101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	150 mm (5.91") 200 mm (7.87")	K 3 K 4	
200 11111 (0.07 7.07 )		14.4	

Remote seals for transmitters and pressure gauges

## Diaphragm seals of sandwich design with flexible capillary

Selection and Ordering data	Article No. Ord.code
Diaphragm seal	
Sandwich-type design, with flexible capillary connected to a SITRANS P transmitter (order separately):	
<b>for pressure</b> 7MF403 and 7MF423 together with Order code "V01" (Negative pressure service) and 7MF802 <sup>1)</sup> ; Scope of delivery (1 off)	7 M F 4 9 0 0 -
for absolute pressure 7MF433; Scope of delivery (1 off)	7 M F 4 9 0 1 -
for differential pressure and flow 7MF443 and 7MF54; scope of delivery 2 off	7 M F 4 9 0 3 -
	1 - B - B
Filling liquid Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O <sub>2</sub> ) <sup>4)</sup> Food oil (FDA listed)l Other version Add Order code and plain text: Filling liquid:	1 2 3 4 7 9 M1Y
Length of capillary <sup>5)</sup>	
• 1.0 m (3.28 ft) • 1.6 m (5.25 ft) • 2.5 m (8.20 ft) • 4.0 m (13.1 ft) • 6.0 m (19.7 ft) • 8.0 m (26.25 ft) • 10.0 m (32.8 ft)	2 3 4 5 6 7 8
Special lengths for capillaries	
• 2.0 m (6.56 ft) • 3.0 m (9.84 ft) • 5.0 m (16.40 ft) • 7.0 m (23.97 ft) • 9.0 m (29.53 ft)	9 N1C 9 N1E 9 N1G 9 N1J 9 N1L
only for 7MF4903	
• 11.0 m (36.09 ft) • 12.0 m (39.37 ft) • 13.0 m (42.65 ft) • 14.0 m (45.93 ft) • 15.0 m (49.21 ft)	9 N1N 9 N1P 9 N1Q 9 N1R 9 N1S

 $<sup>^{1)}\,</sup>$  With 7MF802.-... and the measuring cells Q, S, T and U also order negative pressure service version.

/	
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
Customer-specific tubus length	Y44
Select range, enter desired length in plain text (No entry = standard length)	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation)	
Pressure and absolute pressure	A01
for differential pressure transmitters	A02
Remote seal nameplate Attached out of stainless steel, contains Article	B20
No. and order number of the remote seal supplier	
Oil- and grease-free cleaned version	C10
Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11
Inspection certificate to EN 10204, section 3.1	C12
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17
Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20"	C20
in the case of SITRANS P DSIII transmitter)	
Functional safety certificate ("SIL 2/3") to IEC 61508	C23
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	D07
Certification acc. to NACE MR-0103	D08
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	
Oil- and grease-free cleaned version	E10
Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	
<b>Epoxy painting</b> (not possible with vacuum-proof design and not for 7MF4901)	E15
Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1	
One-sided mounting on differential pressure transmitters	
(only for 7MF4900)	
on high-pressure side on low-pressure side	H10 H11

<sup>2)</sup> Only possible up to max. PN 100.

<sup>3)</sup> For vacuum on request

Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
 Max. capillary length, see section "Technical description".

Remote seals for transmitters and pressure gauges

Order code	Selection and Ordering data	Order code
	Further designs	
	Please add "-Z" to Article No. and specify Order code.	
	PE protective tube	
	over the spiral protective tube of the capillaries	
10.4	(color: white)	
	1.0 m (3.28 ft)	N20
	1.6 m (5.25 ft)	N21
	2.0 m (6.56 ft)	N22
	2.5 m (8.20 ft)	N23
	,	N24
J11	,	N25
	, ,	
	,	N26
J12	, ,	N27
	7.0 m (22.97 π)	N28
	8.0 m (26.25 ft)	N29
	9.0 m (29.53 ft)	N30
	10.0 m (32.81 ft)	N31
11.4	only for 7MF4903	
014	<del></del>	N32
	,	N33
104	,	N34
J24	,	
	, ,	N35
	15.0 m (49.21 ft)	N36
	PTFE protective tube	
	over the spiral protective tube of the capillaries	
	(color: transparent)	
	1.0 m (3.28 ft)	N40
J30	1.6 m (5.25 ft)	N41
J31	2.0 m (6.56 ft)	N42
J32	2.5 m (8.20 ft)	N43
J33	,	N44
J34	,	N45
J35	,	N46
		N47
	, ,	N47 N48
140	,	
	,	N49
	,	N50
	ιυ.υ m (32.81 π)	N51
	only for 7MF4903	
	11.0 m (36.09 ft)	N52
U+U		N53
	13.0 m (42.65 ft)	N54
	14.0 m (45.93 ft)	N55
	17.0 HT 190.00 HT	1433
.150	, ,	NEG
J50	15.0 m (49.21 ft)	N56
J51	, ,	N56
J51 J52	, ,	N56
J51	, ,	N56
	J0A J0B J0C J0D J0E J11 J12 J14 J24 J30 J31 J32 J33 J34	Further designs Please add "-Z" to Article No. and specify Order code.  PE protective tube over the spiral protective tube of the capillaries (color: white)  1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft) 2.5 m (8.20 ft) 3.0 m (9.84 ft) 4.0 m (13.12 ft) 5.0 m (16.40 ft) 6.0 m (19.69 ft) 7.0 m (22.97 ft) 8.0 m (26.25 ft) 9.0 m (29.53 ft) 13.0 m (42.65 ft) 14.0 m (43.37 ft) 15.0 m (46.93 ft) 15.0 m (46.93 ft) 15.0 m (49.21 ft)  PTFE protective tube over the spiral protective tube of the capillaries (color: transparent) 1.0 m (3.28 ft)

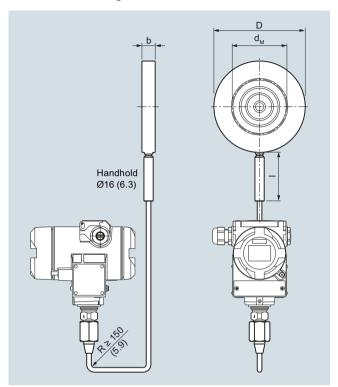
Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
PVC protective tube	
over the spiral protective tube of the capillaries (color: black)	
1.0 m (3.28 ft)	N60
1.6 m (5.25 ft)	N61
2.0 m (6.56 ft)	N62
2.5 m (8.20 ft)	N63 N64
3.0 m (9.84 ft) 4.0 m (13.12 ft)	N65
5.0 m (16.40 ft)	N66
6.0 m (19.69 ft)	N67
7.0 m (22.97 ft)	N68
8.0 m (26.25 ft)	N69
9.0 m (29.53 ft)	N70
10.0 m (32.81 ft)	N71
only for 7MF4903	
11.0 m (36.09 ft)	N72
12.0 m (39.37 ft) 13.0 m (42.65 ft)	N73 N74
,	
14.0 m (45.93 ft) 15.0 m (49.21 ft)	N75 N76
Negative pressure service	
for use in low-pressure range for transmitters for	
• gauge and absolute pressure from the pressu-	V01
re series • differential pressure	V03
Extended negative pressure service	_
for use in low-pressure range for transmitters for	
gauge and absolute pressure from the pressure series	V51
differential pressure	V53

### Remote seals for transmitters and pressure gauges

### Diaphragm seals of sandwich design with flexible capillary

### Dimensional drawings



Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)

#### Connection to EN 1092-1

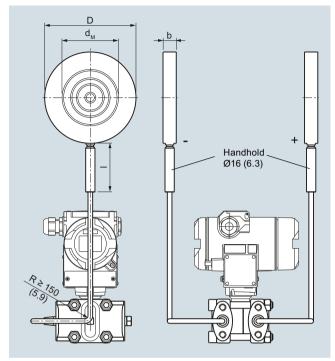
Nom. diam.	Nom. press.	b	D	d <sub>M</sub>	I
		mm	mm	mm	mm
DN 50	PN 16 PN 400	20	102	59	100
DN 80		20	138	89	100
DN 100		20	158	89	100
DN 125		22	188	124	100

#### Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d <sub>M</sub>	I
	lb/sq.in.	mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
2 inch	150 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5  $\,$ 

d<sub>M</sub>: Effective diaphragm diameter



Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

#### Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d <sub>M</sub>	I
		mm	mm	mm	mm
DN 50	PN 16 PN 400	20	102	59	100
DN 80	_	20	138	89	100
DN 100	-	20	158	89	100
DN 125		22	188	124	100

### Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d <sub>M</sub>	I
	lb/sq.in.	mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
2 inch	150 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5  $\,$ 

d<sub>M</sub>: Effective diaphragm diameter

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design with flexible capillary

### Overview



Diaphragm seals of flange design

Diaphragm seals of flange design with flexible capillary		Sheath	Spiral protective tube made of	
Nominal diameter	Nominal pressure		stainless steel, mat. no. 1.4301/304	
DN 50 (recommendable only for pressure transmitters for pressure)	PN 10/16/25/40, PN 100	Sealing material in the process flanges		
• DN 80	PN 10/16/25/40, PN 100	<ul> <li>For pressure transmitters, absolute pressure transmitters and low-</li> </ul>	Copper	
• DN 100	PN 10/16, PN 25/40	pressure applications		
• DN 125	PN 16, PN 40	<ul> <li>For other applications</li> </ul>	Viton	
• 2 inch (recommendable only for pressure transmitters for pressure)	Class 150, class 300, class 400/600, class 900/1500	Maximum pressure	See above and the technical data of the pressure transmitter	
• 3 inch	Class 150, class 300, class 600	Tube length	Without tube as standard (tube	
• 4 inch	Class 150, class 300, class 400	O and ill a mark	available on request)	
• 5 inch	Class 150, class 300, class 400	Capillary	Mary 10 77 (00 0 ft) Janaan	
Sealing face		Length	Max. 10 m (32.8 ft), longer lengths on request	
• For stainless steel, mat.	To EN 1092-1, form B1 or	Internal diameter	2 mm (0.079 inch)	
No. 1.4404/316L	ASMR B16.5 RF 125 250 AA	Minimum bending radius	150 mm (5.9 inch)	
For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF	Filling liquid		
Materials		(for remote seals of sandwich and	Silicone oil M5	
Main body	Stainless steel mat. no. 1.4404/316L	flange design)	Silicone oil M50	
Wetted parts	Stainless steel		High-temperature oil	
	mat. no. 1.4404/316L		Halocarbon oil (for measuring O2)	
	Without coating		Food oil (FDA listed)	
	<ul><li>PTFE coating</li><li>ECTFE coating (for vacuum on request)</li></ul>	Permissible ambient temperature	Dependent on the pressure trans- mitter and the filling liquid of the remote seal	
	PFA coating		More information can be found in	
	Monel 400, mat. No. 2.4360		the technical data of the pressure transmitters and in the section	
	Hastelloy C276, mat. No. 2.4819		"Technical data of filling liquid" in	
	Hastelloy C4, mat. No. 2.4610		the Technical description to the remote seals	
	Hastelloy C22, WNr. 2.4602	Weight	Approx. 4 kg (8.82 lb)	
	Tantalum	Certificate and approvals		
Titanium, WNr. 3.7035	Classification according to pressure	For gases of fluid group 1 and liq-		
	Nickel 201	equipment directive (DRGL 97/23/EC)	uids of fluid group 1; complies with requirements of article 3,	
	Duplex 2205, mat. no. 1.4462	(232 37/23/23)	paragraph 3 (sound engineering	
Stainless steel 316L, gold plate thickness approx. 25 µm			practice)	

Capillary

Stainless steel, mat. No. 1.4571/316Ti

Remote seals for transmitters and pressure gauges

Selection and Ordering	ı data	Article I	<u>No.</u> O	rd. code	Selection and Ordering da	ta	Article No.	Ord. co
Diaphragm seal					Diaphragm seal			
Flange design, with flexil to a pressure transmitter SITRANS P (order separ					Flange design, with flexible to a pressure transmitter SITRANS P (order separate	•		
for pressure 7MF403 together with Order code sure service) and 7MF80 scope of delivery: 1 off	"V01" (Negative pres-	7 M F 4	920	-	for pressure 7MF403 and together with Order code "V0 sure service) and 7MF802 scope of delivery: 1 off	1" (Negative pres-	7 M F 4 9 2	0 -
for absolute pressure 7 scope of delivery: 1 off	7MF433;	7 M F 4	921	•	for absolute pressure 7MF scope of delivery: 1 off	433;	7 M F 4 9 2	1 -
for differential pressure and 7MF54; scope o		7 M F 4	923	-	for differential pressure ar and 7MF54; scope of de		7 M F 4 9 2	3 -
7 Click on the Article No ration in the PIA Life (		1===		В	Tube length		1	В
Nominal diameter and	nominal pressure				without tube		0	
	10/16/25/40	Α			Other version:		Z 8	Κ.
PN	100	В			Add Order code and plain t	ext.		.,
(DN 50 recommended of transmitters for pressure	nly for pressure				Wetted parts materials:, Tube length:	OAL.		
•	•						-	
	10/16/25/40   100	D E			Customer-specific tubus le Specify customer-specific le	•		
• DN 100 PN	10/16	G			Order Code			
	25/40	Н			Wetted parts materials: Stai			
DIN 125	116	J			Range	Standard length		
	140	K			20 50 mm (0.79 1.97")	50 mm (1.97")	A 1	
					51 100 mm (2.01 3.94"	) 100 mm (3.94")	A 2	
	ass 150	L			101 150 mm (3.98 5.91	") 150 mm (5.91")	A 3	
	ass 300	M			151 200 mm (5.94 7.87	") 200 mm (7.87")	A 4	
	ass 400/600	N			201 250 mm (7.91 9.8 <sup>2</sup>		A 5	
Cla 2 inch recommended o	ass 900/1500 nly for pressure	P			Wetted parts materials: Sta with ECTFE	, , ,		
transmitters for pressure	*				Range	Standard length		
	ass 150	Q						
	ass 300	R			20 50 mm (0.79 1.97")	50 mm (1.97")	F 1	
Cla	ass 600	S			51 100 mm (2.01 3.94"	, , , ,	F 2	
• 4 inch Cla	ass 150	T			101 150 mm (3.98 5.91		F 3	
Cla	ass 300	U			151 200 mm (5.94 7.87		F 4	
Cla	ass 400	V			201 250 mm (7.91 9.84	4") 250 mm (9.84")	F 5	
					Wetted parts materials: Sta	inless steel coated		
	ass 150	W			with PFA			
	ass 300	X			Range	Standard length		
	ass 400	Y			20 50 mm (0.79 1.97")	50 mm (1.97")	D 1	
Smooth sealing face to E	-N 1092-1, form B1 or				,	, ,	D 1	
to ASME B16.5 RF 125.	200 AA				51 100 mm (2.01 3.94"	, , ,		
Other version		Z		J 1 Y	101 150 mm (3.98 5.91		D 3	
Add Order code and pla					151 200 mm (5.94 7.87	, , ,	D 4	
Nominal diameter:; No Sealing face: See "Techr					201 250 mm (7.91 9.8 <sup>2</sup>	4") 250 mm (9.84")	D 5	
					<ul> <li>Wetted parts materials: Mo</li> </ul>			
Wetted parts materials					Range	Standard length		
Stainless steel 316L					20 50 mm (0.79 1.97")	50 mm (1.97")	G 1	
- without coating		A			51 100 mm (2.01 3.94"	` '	G 2	
- with PTFE coating		E 0			101 150 mm (3.98 5.91	, , ,	G 3	
- with ECTFE coating <sup>2</sup>	)	F			151 200 mm (5.94 7.87	, , , ,	G 4	
- with PFA coating		D						
<ul> <li>Monel 400, mat. No. 2.</li> </ul>	4360	G			Wetted parts materials: Has			
<ul> <li>Hastelloy C276, mat. N</li> </ul>	lo. 2.4819	J			Range	Standard length		
<ul> <li>Hastelloy C4, mat. No.</li> </ul>	2.4610	U			20 50 mm (0.79 1.97")	50 mm (1.97")	J 1	
<ul> <li>Hastelloy C22, mat. No</li> </ul>	o. 2.4602	V 0			51 100 mm (2.01 3.94"	) 100 mm (3.94")	J 2	
Tantalum		K 0			101 150 mm (3.98 5.91	") 150 mm (5.91")	J 3	
<ul> <li>Titanium, mat. No. 3.70</li> </ul>	035 (max. 150 °C	L			151 200 mm (5.94 7.87	, , ,	J 4	
(302 °F))					Wetted parts materials: Tan			
<ul> <li>Nickel 201 (max. 260 °</li> </ul>	°C (500 °F))	M O			· ·			
• Duplex 2205, mat. no.	' ''	Q 0			Range	Standard length		
<ul> <li>Duplex 2205, mat. no.</li> </ul>		R			20 50 mm (0.79 1.97")	50 mm (1.97")	K 1	
<ul> <li>Stainless steel 316L, g</li> </ul>		S O			51 100 mm (2.01 3.94"		K 2	
					101 150 mm (3.98 5.91	") 150 mm (5.91")	K 3	
thickness approx. 25 µ	ım				101 100 11111 (0.30 0.31	,		

Remote seals for transmitters and pressure gauges

Selection and Ordering data	Article No. Ord. code
Diaphragm seal	
Flange design, with flexible capillary, connected to a pressure transmitter SITRANS P (order separately):	
for pressure 7MF403 and 7MF423 together with Order code "V01" (Negative pressure service) and 7MF802 <sup>1)</sup> ; scope of delivery: 1 off	7 M F 4 9 2 0 -
for absolute pressure 7MF433; scope of delivery: 1 off	7 M F 4 9 2 1 -
for differential pressure and flow 7MF443 and 7MF54; scope of delivery: 2 off	7 M F 4 9 2 3 -
	1===B
Filling liquid  • Silicone oil M5  • Silicone oil M50  • High-temperature oil  • Halocarbon oil (for measuring O <sub>2</sub> ) <sup>3)</sup> • Food oil (FDA listed) Other version Add Order code and plain text: Filling liquid:	1 2 3 4 7 9 M1Y
Length of capillary <sup>4)</sup>	
• 1.0 m (3.28 ft) • 1.6 m (5.25 ft) • 2.5 m (8.20 ft) • 4.0 m (13.1 ft) • 6.0 m (19.7 ft) • 8.0 m (26.25 ft) • 10.0 m (32.8 ft)	2 3 4 5 6 7 8
Special lengths for capillaries	
• 2.0 m (6.56 ft) • 3.0 m (9.84 ft) • 5.0 m (16.40 ft) • 7.0 m (23.97 ft) • 9.0 m (29.53 ft)	9 N1C 9 N1E 9 N1G 9 N1J 9 N1L
only for 7MF4923	
• 11.0 m (36.09 ft) • 12.0 m (39.37 ft) • 13.0 m (42.65 ft) • 14.0 m (45.93 ft) • 15.0 m (49.21 ft)	9 N1N 9 N1P 9 N1Q 9 N1R 9 N1S

<sup>1)</sup> With 7MF802.-... and the measuring cells Q, S, T and U also order the negative pressure service.

Selection and Ordering data		
Please add "-Z" to Article No. and specify Order code.  Customer-specific tubus length  Select range, enter desired length in plain text (No entry = standard length)  Spark arrestor With spark arrestor for mounting on zone 0 (including documentation) for transmitters for  • pressure and absolute pressure  • differential pressure  A02  Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Only in conjunction certificate to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0105 Includes acceptance test certificate ("C10")  Oil- an	Selection and Ordering data	Order code
Select range, enter desired length in plain text (No entry = standard length)  Spark arrestor With spark arrestor for mounting on zone 0 (including documentation) for transmitters for  • pressure and absolute pressure  differential pressure  A02  Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2-2  Cuality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate C12  to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)" Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned and packed version, only for coxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF-4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF-40. and 7MF-42. only possible with process connection G/B according to EN	Please add "-Z" to Article No. and specify Order	
enter desired length in plain text (No entry = standard length)  Spark arrestor With spark arrestor for mounting on zone 0 (including documentation) for transmitters for  • pressure and absolute pressure  • differential pressure  A02  Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2  Cuality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0105 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0107  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0107  Includes acceptance test certificate 3.1 according to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921)  Color: transparent,	Customer-specific tubus length	Y44
with spark arrestor for mounting on zone 0 (including documentation) for transmitters for  • pressure and absolute pressure  • differential pressure  A02  Remote seal nameplate  Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with nalocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate  to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.	enter desired length in plain text	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill flild, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/318L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned wersion Oil- and grease-free cleaned version Oil- and grease-free cleaned for the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF-40 and 7MF-42 only possible with process connection of the transmitter. With transmitters 7MF-40 and 7MF-42 only possible wit	With spark arrestor for mounting on zone 0	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate  Oil- and grease-free cleaned and packed version, not for oxygen application of III fluid, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate  Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version oil- greatified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.  With transmitters 7MF40. and 7MF42 only possible with process connection of the transmitter.  With transmitters 7MF40. and 7MF42 only possible with process connection of the transmitter.  One-sided mounting on differential pressure transmitters.	<ul> <li>pressure and absolute pressure</li> </ul>	A01
Attached out of stainless steel, contains MLFB and order number of the remote seal  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate  Oil- and grease-free cleaned and packed version, not for oxygen application of III fluid, certified by certificate of EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF-4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.  With transmitters 7MF-40. and 7MF-42, only possible with process connection of the transmitter.  With transmitters 7MF-40 and 7MF-42, only possible with process connection of the transmitter.  One-sided mounting on differential pressure transmitters.	differential pressure	
Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2  Inspection certificate  to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version  Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 "C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.  With transmitters 7MF40. and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters.  One-sided mounting on differential pressure transmitters.	Attached out of stainless steel, contains MLFB	B20
Inspection certificate to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmiters (only for 7MF4920) on high-pressure side	Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by	C10
to EN 10204, section 3.1  2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters TMF40. and 7MF42., only possible with process connection Gl½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side		C11
Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"  Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version  Oil- and grease-free cleaned version  Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	•	C12
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	Only in conjunction with "Food-grade oil" fill liq-	C17
Functional safety certificate ("SIL 2/3") to IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	IEC 61508	C20
IEC 61508  (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)  Certification acc. to NACE MR-0175  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103  Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Dil- and grease-free cleaned version  Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting  (not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.  With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters  (only for 7MF4920)  on high-pressure side	,	C22
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	IEC 61508 (Only in conjunction with the Order code "C23"	<b>C23</b>
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side		
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of	D07
ding to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)  Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	Certification acc. to NACE MR-0103	D08
Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2  Epoxy painting (not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side	ding to EN 10204 (only for wetted parts made of	
(not possible with negative pressure service and not for 7MF4921)  Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.  With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters  (only for 7MF4920) on high-pressure side	Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certi-	E10
the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.  One-sided mounting on differential pressure transmitters (only for 7MF4920) on high-pressure side  H10	(not possible with negative pressure service	E15
transmitters (only for 7MF4920) on high-pressure side  H10	the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only possible with process connection G½B accord-	
on high-pressure side H10	transmitters	
	on high-pressure side	

negative pressure service.

For vacuum on request.

Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.

Max. capillary length, see section "Technical description".

### Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code.		Further designs Please add "-Z" to Article No. and specify Order code.	
Flanges according to EN 1092-1, sealing surface B1 (Stainless steel 316L) (only in combination with "Z" at data position 9) DN 25, PN 10/16/25/40 DN 25, PN 63/100/160 DN 40, PN 10/16/25/40 DN 40, PN 63/100	J0A J0B J0C J0D	Flange acc. to JIS, in stainless steel 316L (only in combination with "Z" at data position 9) JIS DN 50, 10 K 316L JIS DN 50, 20 K 316L JIS DN 80, 10 K 316L JIS DN 80, 20 K 316L Radial capillary pipe outlet	J7A J7B J7C J7D
DN 40, PN 160  Sealing surface smooth, form B2 or RFSF (Stainless steel diaphragm)	J0E J11	for one-sided mounting for two-sided mounting	K01 K03
previously DIN 2501, form E  Sealing surface groove, EN 1092-1, form D	J14	PE protective tube over the spiral protective tube of the capillaries (color: white)	
instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)  Sealing surface with spring according to EN 1092-1, form C, (previously DIN 2512, form F) in stainless steel 316L		1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft) 2.5 m (8.20 ft)	N20 N21 N22 N23
DN 25 DN 40 DN 50	J30 J31 J32	3.0 m (9.84 ft) 4.0 m (13.12 ft) 5.0 m (16.40 ft)	N24 N25 N26
DN 80 DN 100 DN 125	J33 J34 J35	6.0 m (19.69 ft) 7.0 m (22.97 ft) 8.0 m (26.25 ft)	N27 N28 N29
Sealing surface with male face according to EN 1092-1, form E (previously DIN 2512, form V13) in stainless steel 316L  DN 25	J40	9.0 m (29.53 ft) 10.0 m (32.81 ft) only for 7MF4923	N30 N31
DN 40 DN 50 DN 80	J41 J42 J43	11.0 m (36.09 ft) 12.0 m (39.37 ft) 13.0 m (42.65 ft)	N32 N33 N34
DN 100 DN 125 Sealing surface with female face according to	J44 J45	14.0 m (45.93 ft) 15.0 m (49.21 ft)	N35 N36
EN 1092-1, form F (previously DIN 2512, form R13) in stainless steel 316L DN 25	J50	<b>PTFE protective tube</b> over the spiral protective tube of the capillaries (color: transparent)	
DN 40 DN 50 DN 80 DN 100 DN 125	J51 J52 J53 J54 J55	1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft) 2.5 m (8.20 ft)	N40 N41 N42 N43
Flange according to ASME B16.5 RF 125 250 AA, in stainless steel 316L (only in combination with "Z" at data position 9) 1", class 150	J6A	3.0 m (9.84 ft) 4.0 m (13.12 ft) 5.0 m (16.40 ft) 6.0 m (19.69 ft)	N44 N45 N46 N47
1", class 300 1", class 400/600 1", class 900/1500	J6B J6C J6D	7.0 m (22.97 ft) 8.0 m (26.25 ft) 9.0 m (29.53 ft)	N48 N49 N50
1½", class 150 1½", class 300 1½", class 400/600 1½", class 900/1500	J6E J6F J6G J6H	10.0 m (32.81 ft) only for 7MF4923 11.0 m (36.09 ft) 12.0 m (39.37 ft)	N51 N52 N53
Sealing surface B1 or ASME B16.5 RF 125 250 AA instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276	J12	12.0 ft (39.37 ft) 13.0 m (42.65 ft) 14.0 m (45.93 ft) 15.0 m (49.21 ft)	N54 N55 N56
(2.4819), tantalum and Duplex 2205 (1.4462) and for nominal sizes 2", 3", DN 50 and DN 80) Sealing surface RJF (groove) ASME B16.5	J24	•	
instead of sealing surface ASME B16.5 RF 125 250 AA (only for wetted parts made of stainless steel 316L)			

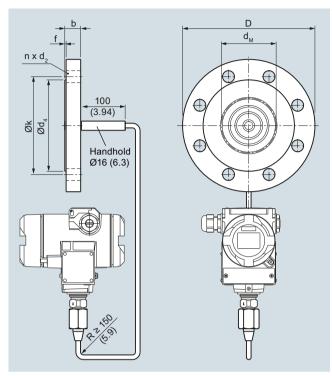
Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code
PVC protective tube	
over the spiral protective tube of the capillaries (color: black)	
1.0 m (3.28 ft)	N60
1.6 m (5.25 ft) 2.0 m (6.56 ft)	N61 N62
2.5 m (8.20 ft)	N63
3.0 m (9.84 ft)	N64
4.0 m (13.12 ft)	N65
5.0 m (16.40 ft)	N66
6.0 m (19.69 ft) 7.0 m (22.97 ft)	N67 N68
8.0 m (26.25 ft)	N69
9.0 m (29.53 ft)	N70
10.0 m (32.81 ft)	N71
only for 7MF4923	
11.0 m (36.09 ft)	N72
12.0 m (39.37 ft) 13.0 m (42.65 ft)	N73 N74
14.0 m (45.93 ft)	N75
15.0 m (49.21 ft)	N76
Negative pressure service	
for use in low-pressure range for transmitters for	
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V01
differential pressure	V03
Extended negative pressure service	
for use in low-pressure range for transmitters for	
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V51
differential pressure	V53

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design with flexible capillary

### Dimensional drawings



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)

#### Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d <sub>2</sub> mm	d <sub>4</sub> mm	d <sub>M</sub> mm	f mm	k mm	n
DN 50	PN 10/16/ 25/40	20	165	18	102	59	2	125	4
	PN 100	28	195	26	102	59	2	145	4
DN 80	PN 10/16/	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 10/16	20	220	18	158	89	2	180	8
	PN 25/40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

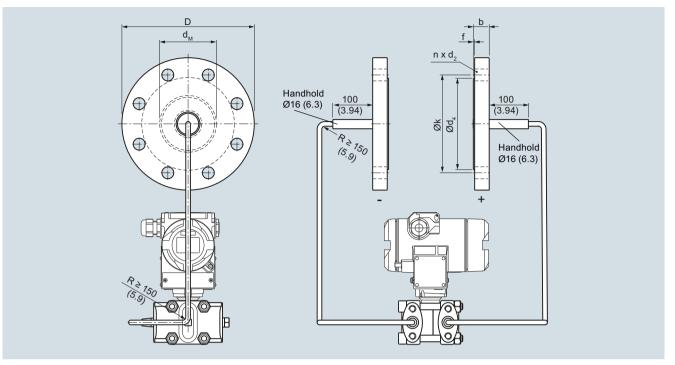
#### Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	d <sub>M</sub>	f	k	n
	lb/sq.in.	mm	mm	mm	mm	mm	mm	mm	
		(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	
2 inch	150	19.5	150	20	92	59	2	120.5	4
		(0.77)	(5.80)	(0.79)	(3.62)	(2.32)	(80.0)	(4.74)	
	300	22.7	165	20	92	59	2	127	8
		(0.89)	(6.50)	(0.79)	(3.62)	(2.32)	(80.0)	(5)	
	400/600	32.4	165	20	92	59	2	127	8
		(1.28)	(6.50)	(0.79)	(3.62)	(2.32)	(80.0)	(5)	
	900/1500	45.1	215	26	92	59	7	165	8
		(1.78)	(8.46)	(1.02)	(3.62)	(2.32)	(0.28)	(6.5)	
3 inch	150	24.3	190	20	127	89	2	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3.50)	(80.0)	(6)	
	300	29	210	22	127	89	2	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3.50)	(80.0)	(6.63)	
	600	38.8	210	22	127	89	7	168.5	8
		(1.53)	(8.27)	(0.87)	(5)	(3.50)	(0.28)	(6.63)	
4 inch	150	24.3	230	20	158	89	2	190.5	8
		(0.96)	(9.06)	(0.79)	(6.22)	(3.50)	(80.0)	(7.5)	
	300	32.2	255	22	158	89	2	200	8
		(1.27)	(10.04)	(0.87)	(6.22)	(3.50)	(80.0)	(7.87)	
	400	42	255	26	158	89	7	200	8
		(1.65)	(10.04)	(1.02)	(6.22)	(3.50)	(0.28)	(7.87)	
5 inch	150	24.3	255	22	186	124	2	216	8
		(0.96)	(10.04)	(0.87)	(7.32)	(4.88)	(80.0)	(8.50)	
	300	35.8	280	22	186	124	2	235	8
		(1.41)	(11.02)	(0.87)	(7.32)	(4.88)	(80.0)	(9.25)	
	400	45.1	280	26	186	124	7	235	8
		(1.79)	(11.02)	(1.02)	(7.32)	(4.88)	(0.28)	(9.25)	

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5  $\rm d_{\rm M}$ : Effective diaphragm diameter

### Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design with flexible capillary



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

### Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d <sub>2</sub> mm	d <sub>4</sub> mm	d <sub>M</sub> mm	f mm	k mm	n
DN 80	PN 10/16	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 10/16	20	220	18	158	89	2	180	8
	PN 25/40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

### Connection to ASME B16.5

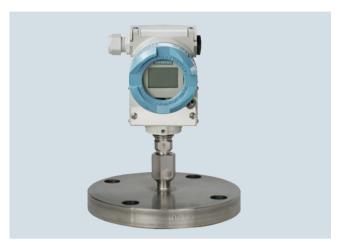
Nom. diam.	Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	d <sub>M</sub>	f	k	n
	lb/sq.in.	mm	mm	mm	mm	mm	mm	mm	
		(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	
	150	24.3	190	20	127	89	2	152.5	4
3 inch	150	(0.96)	(7.48)	(0.79)	(5)	(3.50)	(0.08)	(6)	
	200	29	210	22	127	89	2	168.5	8
	300	(1.14)	(8.27)	(0.87)	(5)	(3.50)	(0.08)	(6.63)	
	600	38.8	210	22	127	89	7	168.5	8
	600	(1.52)	(8.27)	(0.87)	(5)	(3.50)	(0.28)	(6.63)	
	150	24.3	230	20	158	89	2	190.5	).5 8
	150	(0.96)	(9.06)	(0.79)	(6.22)	(3.50)	(0.08)	(7.5)	
4 inch	200	32.2	255	22	158	89	2	200	8
4 Inch	300	(1.27)	(10.04)	(0.87)	(6.22)	(3.50)	(0.08)	(7.87)	
	400	42	255	26	158	89	7	200	8
	400	(1.65)	(10.04)	(1.02)	(6.22)	(3.50)	(0.28)	(7.87)	4 8 8 8 8
	150	24.3	255	22	186	124	2	216	8
	150	(0.96)	(10.04)	(0.87)	(7.32)	(4.88)	(0.08)	(8.50)	
e	300	35.8	280	22	186	124	2	235	8
5 inch	300	(1.41)	(11.02)	(0.87)	(7.32)	(4.88)	(80.0)	(9.25)	
	400	45.1	280	26	186	124	7	235	8
	400	(1.79)	(11.02)	(1.02)	(7.32)	(4.88)	(0.28)	(9.25)	

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5  $\rm d_{M}$ : Effective diaphragm diameter

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design directly fitted on transmitter

### Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for pressure

### Technical specifications

# Diaphragm seals (flange design) for pressure and absolute pressure, directly fitted on a transmitter

KI 'I	12
INominal	diameter

- DN 50
- DN 80
- DN 100
- 2 inch
- 3 inch
- 4 inch

### Sealing face

- For stainless steel, mat. No. 1.4404/316L
- For the other materials

#### Materials

- Main body
- Wetted parts

Nominal pressure

PN 10/16/25/40, PN 100

PN 10/16/25/40, PN 100

PN 10/16, PN 25/40

Class 150, class 300, class 400/600, class 900/1500

Class 150, class 300, class 600

Class 150, class 300, class 400

To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA

Smooth to EN 1092-1, form B2 or ASME B16.5 RFSF

Stainless steel mat. no. 1.4404/316L

Stainless steel mat. no. 1.4404/316L

- Without coating
- PTFE coating
- ECTFE coating (for vacuum on request)
- PFA coating

Monel 400, mat. No. 2.4360 Hastelloy C276, mat. No. 2.4819 Hastelloy C4, mat. No. 2.4610 Hastelloy C22, mat No. 2.4602

Tantalum

Titanium, mat. No. 3.7035

Nickel 201

Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, thickness approx. 25 µm

Stainless steel, 1.4571/316Ti

Copper

Maximum pressure

Tube length

### Capillary

- Length
- Internal diameter
- Minimum bending radius

Filling liquid

• 100 mm (3.94 inch)

See above and the technical data

• Without tube

of the transmitter

- 50 mm (1.97 inch)
- 150 mm (5.91 inch)
- 200 mm (7.87 inch)

Max. 10 m (32.8 ft), longer lengths on request

2 mm (0.079 inch)

150 mm (5.9 inch)

- Silicone oil M5
- Silicone oil M50
- High-temperature oil
- Halocarbon oil (for measuring O<sub>2</sub>)
- Food oil (FDA listed)

170 °C (338 °F)

Max. recommended process temperature

Permissible ambient temperature

Dependent on the pressure transmitter and the filling liquid of the remote seal.

More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals.

Approx. 4 kg (8.82 lb)

#### Certificate and approvals

Weight

Classification according to pressure equipment directive (DRGL 97/23/EC)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Capillary

Sealing material at the transmitter connection

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design directly fitted on transmitter

Selection and Ordering data			No. Ord. code	Selection and Ordering data	Article No. Ord. code		
Diaphragm sea	I	7 M F 4	910-	Diaphragm seal		7MF49	910-
SITRANS P for p 7MF423 toge	a pressure transmitter pressure 7MF403 and ether with Order code "V01" (Negervice) and 7MF802 <sup>1)</sup> ; must parately			Directly fitted to a pressure transITRANS P for pressure 7MF4/7MF423 together with Orde ative pressure service) and 7M be ordered separately	03 and r code "V01" (Neg-		ı
	Article No. for the online configu- PIA Life Cycle Portal.			Customer-specific tubus leng	•		
Process conne	ction ure transmitter upright)	0		<ul><li>Order Code</li><li>Wetted parts materials: Stainle</li></ul>			
Horizontal	ure transmitter uprignit)	2		Range	Standard length		
Nominal diame	ter and nominal pressure PN 10/16/25/40 PN 100	A B		20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	50 mm (1.97") 100 mm (3.94") 150 mm (5.91")	A 1 A 2 A 3	
• DN 80	PN 10/16/25/40 PN 100	D E		151 200 mm (5.94 7.87") 201 250 mm (7.91 9.84")	200 mm (7.87") 250 mm (9.84")	A 4 A 5	
• DN 100	PN 10/16 PN 25/40	G H		<ul> <li>Wetted parts materials: Stainle with ECTFE</li> <li>Range</li> </ul>	ess steel coated   Standard length		
• 2 inch	Class 150 Class 300 Class 400/600 Class 900/1500	L M N P		20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	50 mm (1.97") 100 mm (3.94") 150 mm (5.91") 200 mm (7.87")	F 1 F 2 F 3 F 4	
• 3 inch	Class 150 Class 300 Class 600	Q R S		201 250 mm (7.91 9.84")  • Wetted parts materials: Stainle PFA	250 mm (9.84")	F 5	
• 4 inch	Class 150 Class 300 Class 400	T U V		Range 20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94")	50 mm (1.97") 100 mm (3.94")	D 1 D 2	
B2, or to ASME I Other version	face to DIN 1092-01, form B1 or B16.5 125 250 AA or RFSF	z	J 1 Y	101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87") 201 250 mm (7.91 9.84")	150 mm (5.91") 200 mm (7.87") 250 mm (9.84")	D 3 D 4 D 5	
	er:; Nominal pressure:	Ш		Wetted parts materials: Monel Range	400   Standard length		
• Stainless steel - without coati - with PTFE co - with ECTFE co	316L ng pating	A E 0 F		20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	50 mm (1.97") 100 mm (3.94") 150 mm (5.91") 200 mm (7.87")	G 1 G 2 G 3 G 4	
<ul><li>with PFA coa</li><li>Monel 400, ma</li></ul>	ating	D G		<ul> <li>Wetted parts materials: Haste Range</li> </ul>	lloy C276   Standard length		
<ul><li>Hastelloy C4, r</li><li>Hastelloy C22,</li><li>Tantalum</li></ul>	6, mat. No. 2.4819 mat. No. 2.4610 , mat. No. 2.4602 No. (max. 150 °C (302 °F))	J U V 0 K L 0		20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87")	200 mm (7.87")	J 1 J 2 J 3 J 4	
• Duplex 2205, \	ax. 260 °C (500 °F)) WNr. 1.4462   316L, gold plated,	M 0 Q S 0		Wetted parts materials: Tantal Range     20 50 mm (0.79 1.97")	Standard length	K 1	ш
thickness appr Tube length		-		51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91")	100 mm (3.94") 150 mm (5.91")	K 2 K 3	
<ul> <li>Without tube</li> <li>Other version:</li> <li>Add Order code</li> <li>Wetted parts ma</li> <li>Tube length:</li> </ul>		0 Z 8	K 1 Y	Filling liquid Silicone oil M5 Silicone oil M5 High-temperature oil	200 mm (7.87")	2	1 2 3
				Halocarbon oil (for measuring     Food oil (FDA listed)     Other version     Add Order code and plain text     Filling liquid:	<i>-</i> 2,	-	4 7 9 M 1 Y

With 7MF802.-... and the measuring cells Q, S, T and U also order negative pressure service.
 For vacuum on request.
 Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design directly fitted on transmitter

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Please add "-Z" to Article No. and specify Order code.		Please add "-Z" to Article No. and specify Order code.	
Customer-specific tubus length	Y44	Flanges according to EN 1092-1, sealing sur-	
Select range, enter desired length in plain text (No entry = standard length)		face B1 (Stainless steel 316L) (only in combination with "Z" at data position 9) DN 25, PN 10/16/25/40	J0A
Spark arrestor	A01	DN 25, PN 63/100/160 DN 40, PN 10/16/25/40	J0B J0C
With spark arrestor for mounting on zone 0 (including documentation) for transmitters for gauge pressure and absolute pressure		DN 40, PN 63/100 DN 40, PN 160	JOD JOE
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	B20	Sealing surface smooth, form B2 or RFSF (Stainless steel diaphragm) previously DIN 2501, form E	J11
Oil- and grease-free cleaned version	C10	Sealing surface groove, EN 1092-1, form D	J14
Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by		instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)  Sealing surface with spring according to	
certificate acc. to EN 10204-2.2  Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	EN 1092-1, form C, (previously DIN 2512, form F) in stainless steel 316L DN 25	J30
Inspection certificate	C12	DN 40	J31
to EN 10204, section 3.1	O12	DN 50	J32
2.2 Certificate of FDA approval of fill oil	C17	DN 80 DN 100	J33 J34
Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"		DN 125	J35
Functional safety certificate ("SIL 2") to IEC 61508	C20	Sealing surface with male face according to EN 1092-1, form E (previously DIN 2512, form V13) in stainless steel 316L	
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)		DN 25	J40
Functional safety certificate ("SIL 2/3") to	C23	DN 40 DN 50	J41 J42
IEC 61508		DN 80	J43
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)		DN 100	J44
Certification acc. to NACE MR-0175	D07	DN 125	J45
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		Sealing surface with female face according to EN 1092-1, form F (previously DIN 2512, form R13) in stainless steel 316L	
Certification acc. to NACE MR-0103	D08	DN 25 DN 40	J50 J51
Includes acceptance test certificate 3.1 accor-		DN 50	J52
ding to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		DN 80	J53
Oil- and grease-free cleaned version	E10	DN 100 DN 125	J54 J55
Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acts of FN 10004.00		Flange according to ASME B16.5 RF 125 250 AA, in stainless steel 316L (only in combination with "Z" at data position 9) 1", class 150	J6A
ficate acc. to EN 10204-2.2	E16	1", class 300 1", class 400/600	J6B J6C
Epoxy painting  Not possible with negative pressure service	E15	1", class 400/000 1", class 900/1500	J6D
Color: transparent, coverage: front and rear of		1½", class 150	J6E
the remote seal, capillary(ies) or connecting		1½", class 300	J6F
tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only		1½", class 400/600 1½", class 900/1500	J6G J6H
possible with process connection G½B according to EN 837-1.		Sealing surface B1 or ASME B16.5 RF 125 250 AA	J12
		Instead of sealing surface B2 and RFSF (Only for wetted parts in Hastelloy C276 (2.4819), Tantal and Duplex 2205 (1.4462) and for sizes 2", 3", DN 50 and DN 80)	
		Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 250 AA (only for wetted parts made of stainless steel 316L)	J24

Remote seals for transmitters and pressure gauges

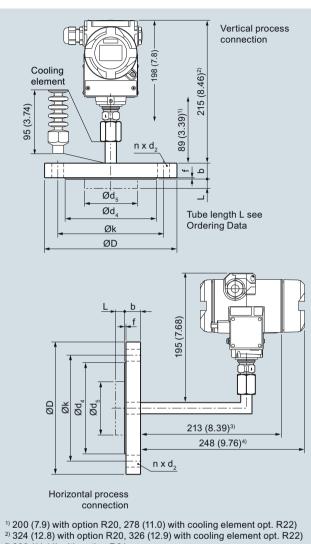
## Diaphragm seals of flange design directly fitted on transmitter

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
Flange acc. to JIS, in stainless steel 316L (only in combination with "Z" at data position 9) JIS DN 50, 10 K 316L JIS DN 50, 20 K 316L JIS DN 80, 10 K 316L JIS DN 80, 20 K 316L JIS DN 80, 20 K 316L	J7A J7B J7C J7D
Elongated pipe 200 mm instead of 89 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R20
Elongated pipe elbow 200 mm instead of 130 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R21
<b>Cooling element</b> max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R22
Negative pressure service	
for use in low-pressure range for transmitters for • gauge and absolute pressure from the pressure series	V01
Extended negative pressure service	
for use in low-pressure range for transmitters for	
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V51

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design directly fitted on transmitter

### Dimensional drawings



- <sup>3)</sup> 283 (11.14) with option R21
- 4) 318 (12.52) with option R21

Diaphragm seals of flange design, direct connection to a SITRANS P pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

### Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>M</sub>	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	
DN 50	PN 10/16/ 25/40	20	165	18	102	48.3	45 <sup>1)</sup>	2	125	4
	PN 100	28	195	26	102	48.3	45 <sup>1)</sup>	2	145	4
DN 80	PN 10/16/ 25/40	24	200	18	138	76	72 <sup>1)</sup>	2	160	8
	PN 100	32	230	26	138	76	72 <sup>1)</sup>	2	180	8
DN 100	PN 10/16	20	220	18	158	94	89-2	2	180	8
	PN 25/40	24	235	22	162	94	89	2	190	8

#### Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	<b>d</b> <sub>5</sub>	d <sub>M</sub>	f	k	n
	lb/	mm	mm	mm	mm	mm	mm	mm	mm	
	sq.in.	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	
2 inch	150	19.5	150	20	92	48.3	45 <sup>1)</sup>	2	120.5	4
		(0.77)	(5.91)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(80.0)	(4.74)	
	300	22.7	165	20	92	48.3	45 <sup>1)</sup>	2	127	8
		(0.89)	(6.5)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(80.0)	(5)	
	400/	32.4	165	20	92	48.3	45 <sup>1)</sup>	7	127	8
	600	(1.28)	(6.5)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(0.28)	(5)	
	900/	45.1	215	26	92	48.3	45 <sup>1)</sup>	7	165	8
	1500	(1.78)	(8.46)	(1.02)	(3.62)	(1.9)	$(1.77)^{1)}$	(0.28)	(6.5)	
3 inch	150	24.3	190	20	127	76	72 <sup>2)</sup>	2	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3)	$(2.83)^{2)}$	(80.0)	(6)	
	300	29	210	22	127	76	72 <sup>2)</sup>	2	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3)	$(2.83)^{2)}$	(80.0)	(6.63)	
	600	38.8	210	22	127	76	72 <sup>2)</sup>	7	168.5	8
		(1.53)	(8.27)	(0.87)	(5)	(3)	$(2.83)^{2)}$	(0.28)	(6.63)	
4 inch	150	24.3	230	20	158	94	89	2	190.5	8
		(0.96)	(9.06)	(0.79)	(6.22)	(3.69)	(3.50)	(80.0)	(7.5)	
	300	32.2	255	22	158	94	89	2	200	8
		(1.27)	(10.04)	(0.79)	(6.22)	(3.69)	(3.50)	(80.0)	(7.87)	
	400	42	255	26	158	94	89	7	200	8
		(1.65)	(10.04)	(1.02)	(6.22)	(3.69)	(3.50)	(0.28)	(7.87)	

d: Inside diameter of gasket according to EN 1092-1/ **ASME B16.5** 

 $d_M$ : Effective diaphragm diameter

- $^{1)}$  59 mm = 2.32 inch with tube length L = 0
- $^{2)}$  89 mm =  $3\frac{1}{2}$  inch with tube length L = 0

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design fixed connection and with capillary

#### Overview



Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

#### Technical specifications

# Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

KI 'I	12
INominal	diameter

- DN 50
- DN 80
- DN 100
- 2 inch
- 3 inch
- 4 inch

#### Sealing face

- For stainless steel, mat. No. 1.4404/316L
- For the other materials

#### Materials

- Main body
- Wetted parts

Nominal pressure

PN 10/16/25/40, PN 100

PN 10/16/25/40

PN 10/16, PN 25/40

Class 150, class 300, class 400/600, class 900/1500

Class 150, class 300

Class 150, class 300

To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA

To EN 1092-1, form B2 or ASME B16.5 RFSF

Stainless steel mat. no. 1.4404/316L

Stainless steel mat. no. 1.4404/316L

- Without coating
- PTFE coating
- ECTFE coating (for vacuum on request)
- · PFA coating

Monel 400, mat. No. 2.4360 Hastelloy C276, mat. No. 2.4819

Hastelloy C4, mat. No. 2.4610 Hastelloy C22, W.-Nr. 2.4602

Tantalum

Titanium, W.-Nr. 3.7035

Nickel 201

Duplex 2205, mat. no. 1.4462

Stainless steel 316L, gold plated, thickness approx. 25 µm

Stainless steel, mat. No. 1.4571/316Ti

Spiral protective tube made of stainless steel, mat. No.

1.4301/304

Sealing material in the process flanges

• For pressure transmitters, absolute pressure transmitters and low-

For other applications

Maximum pressure

Tube length

Capillary • Length

• Minimum bending radius

• Internal diameter

Filling liquid

Max. recommended process

temperature

Permissible ambient temperature

Copper

pressure applications

Viton

See above and the technical data of the pressure transmitter

Without tube 50 mm (1.97 inch) 100 mm (3.94 inch)

150 mm (5.91 inch) 200 mm (7.87 inch)

Max. 10 m (32.8 ft), longer lengths on request

2 mm (0.079 inch) 150 mm (5.9 inch) Silicone oil M5 Silicone oil M50

High-temperature oil

Halocarbon oil (for measuring O2) Food oil (FDA listed)

170 °C (338 °F)

Dependent on the pressure transmitter and the filling liquid of the

remote seal More information can be found in the technical data of the pressure "Technical data of filling liquid" in

transmitters and in the section the Technical description to the remote seals

Approx. 4 kg (8.82 lb)

#### Certificate and approvals

Weight

Classification according to pressure equipment directive (DRGL 97/23/EC)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Capillary

Sheath

Remote seals for transmitters and pressure gauges

Selection and Ordering data	Article No. Ord. code	Selection and Ordering data	Article No. Ord. code
Diaphragm seal	7 M F 4 9 1 3 -	Diaphragm seal	7MF4913-
Mounting flange (with tube as option) for direct mounting to high-pressure side and flanged remote seal without tube, fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III se (7MF443) and SITRANS P500 (7MF54	1 - B - B	Mounting flange (with tube as option) for direct mounting to high-pressure side and flanged remote seal without tube, fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443) and SITRANS P500 (7MF54)	1 - B
Click on the Article No. for the online contration in the PIA Life Cycle Portal.	igu-	Customer-specific tubus length Specify customer-specific length with Y44, see	
Flange, connection to EN 1092-1		Order Code	
Nominal diameter and nominal pressure		Wetted parts materials: Stainless steel without foil	
• DN 50 PN 10/16/25/40 PN 100 • DN 80 PN 10/16/25/40	A B D	Range Standard length 20 50 mm (0.79 1.97") 50 mm (1.97") 51 100 mm (2.01 3.94") 100 mm (3.94")	A 1 A 2
• DN 100 PN 10/16 PN 25/40	G H	101 150 mm (3.98 5.91") 150 mm (5.91") 151 200 mm (5.94 7.87") 200 mm (7.87")	A 3 A 4
Flange, connection to ASME B16.5		201 250 mm (7.91 9.84")   250 mm (9.84")	A 5
Nominal diameter and nominal pressure     2 inch     Class 150     Class 300     Class 400/600     Class 900/1500	L M N P	Wetted parts materials: Stainless steel coated with ECTFE     Range	F 1 F 2
• 3 inch Class 150 Class 300 • 4 inch Class 150 Class 300	Q R T U	101 150 mm (3.98 5.91") 150 mm (5.91") 151 200 mm (5.94 7.87") 200 mm (7.87") 201 250 mm (7.91 9.84") 250 mm (9.84")  • Wetted parts materials: Stainless steel coated	F 3 F 4 F 5
Other version Add Order code and plain text: Flange:, Nominal diameter:; Nominal pressure:  Wetted parts materials	Z J1Y	with PFA Range Standard length 20 50 mm (0.79 1.97") 50 mm (1.97") 51 100 mm (2.01 3.94") 100 mm (3.94") 101 150 mm (3.98 5.91") 150 mm (5.91")	D 1 D 2 D 3
Smooth sealing face to EN 1092-1, form B1 B2, or to ASME B16.5 RF 125 250 AA or F • Stainless steel 316L - without coating		151 200 mm (5.94 7.87") 200 mm (7.87") 201 250 mm (7.91 9.84") 250 mm (9.84") • Wetted parts materials: Monel 400	D 4 D 5
<ul> <li>with PTFE coating</li> <li>with ECTFE coating<sup>1)</sup></li> <li>with PFA coating</li> <li>Monel 400, mat. No. 2.4360</li> </ul>	E O F D G	Range Standard length 20 50 mm (0.79 1.97") 50 mm (1.97") 51 100 mm (2.01 3.94") 100 mm (3.94") 101 150 mm (3.98 5.91") 150 mm (5.91")	G1 G2 G3
<ul> <li>Hastelloy C276, mat. No. 2.4819</li> <li>Hastelloy C4, mat. No. 2.4610</li> <li>Hastelloy C22, mat. No. 2.4602</li> <li>Tantalum</li> </ul>	J U V O K	<ul> <li>151 200 mm (5.94 7.87")</li> <li>Wetted parts materials: Hastelloy C276</li> <li>Range</li> <li>Standard length</li> </ul>	G 4
<ul> <li>Titanium, mat. No. 3.7035 (max. 150 °C (302 °F))</li> <li>Nickel 201 (max. 260 °C (500 °F))</li> <li>Duplex, mat. no. 1.4462</li> </ul>	L O M O Q	20 50 mm (0.79 1.97") 50 mm (1.97") 51 100 mm (2.01 3.94") 100 mm (3.94") 101 150 mm (3.98 5.91") 150 mm (5.91") 151 200 mm (5.94 7.87") 200 mm (7.87")	J 1 J 2 J 3 J 4
<ul> <li>Duplex, mat. no. 1.4462, incl. main body</li> <li>Stainless steel 316L, gold plated, thickness approx. 25 μm</li> </ul>	R S 0	Wetted parts materials: Tantalum     Range	
Tube length (for mounting flange on high-pressure side) • Without tube Other version: Add Order code and plain text: Wetted parts materials:	0 Z 8 K 1 Y	20 50 mm (0.79 1.97") 51 100 mm (2.01 3.94") 101 150 mm (3.98 5.91") 151 200 mm (5.94 7.87") 200 mm (7.87")	K 1 K 2 K 3 K 4
Tube length:			

Remote seals for transmitters and pressure gauges

Selection and Ordering data	Article No. Ord. code
Diaphragm seal	7MF4913-
Mounting flange (with tube as option) for direct mounting to high-pressure side and flanged remote seal without tube, fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443) and SITRANS P500 (7MF54)	1 - B
Filling liquid  Silicone oil M5  Silicone oil M50  High-temperature oil Halocarbon oil (for measuring O <sub>2</sub> ) <sup>2)</sup> Food oil (FDA listed) Other version Add Order code and plain text: Filling liquid:	1 2 3 4 7 9 M1Y
Length of capillary³)  • 1.0 m (3.28 ft)  • 1.6 m (5.25 ft)  • 2.5 m (8.20 ft)  • 4.0 m (13.1 ft)  • 6.0 m (19.7 ft)  • 8.0 m (26.25 ft)  • 10.0 m (32.8 ft)  Special lengths for capillaries	2 3 4 5 6 7 8
• 2.0 m (6.56 ft) • 3.0 m (9.84 ft) • 5.0 m (16.40 ft) • 7.0 m (23.97 ft) • 9.0 m (29.53 ft)	9 N1C 9 N1E 9 N1G 9 N1J 9 N1L

For vacuum on request.
 Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
 Max. capillary length, see section "Technical description".

Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs	Craci coac	Flanges according to EN 1092-1, sealing	Order code
Please add "-Z" to Article No. and specify Order		surface B1 (Stainless steel 316L)	
code.		(only in combination with "Z" at data position 9)	10.4
Customer-specific tubus length	Y44	DN 25, PN 10/16/25/40 DN 25, PN 63/100/160	J0A J0B
Select range,		DN 40, PN 10/16/25/40	J0C
enter desired length in plain text		DN 40, PN 63/100	J0D
(No entry = standard length)		DN 40, PN 160	J0E
Spark arrestor	A02	Sealing surface smooth, form B2 or RFSF	J11
With spark arrestor for mounting on zone 0 (including documentation)		(Stainless steel diaphragm)	
,		previously DIN 2501, form E	
Remote seal nameplate	B20	Sealing surface groove, EN 1092-1, form D	J14
Attached out of stainless steel, contains MLFB and order number of the remote seal		instead of sealing surface B1 (only for wetted	
Oil- and grease-free cleaned version	C10	parts made of stainless steel 316L)	
Oil- and grease-free cleaned and packed ver-	0.10	Sealing surface with spring according to	
sion, not for oxygen application, only in conjunc-		EN 1092-1, form C, (previously DIN 2512, form F) in stainless steel 316L	
tion with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2		DN 25	J30
		DN 40	J31
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	DN 50	J32
•	040	DN 80	J33
Inspection certificate to EN 10204, section 3.1	C12	DN 100	J34
,	045	DN 125	J35
2.2 Certificate of FDA approval of fill oil	C17	Sealing surface with male face according to	
Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"		EN 1092-1, form E (previously DIN 2512, form V13) in stainless steel 316L	
Functional safety certificate ("SIL 2") to	C20	DN 25	J40
IEC 61508	C20	DN 40	J41
Only in conjunction with the Order code "C20"		DN 50	J42
in the case of SITRANS P DSIII transmitter)		DN 80	J43
Functional safety certificate ("SIL 2/3") to	C23	DN 100	J44
IEC 61508		DN 125	J45
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)		Sealing surface with female face according to	
Certification acc. to NACE MR-0175	D07	EN 1092-1, form F (previously DIN 2512, form R13) in stainless steel 316L	
Includes acceptance test certificate 3.1 accor-	D07	DN 25	J50
ding to EN 10204 (only for wetted parts made of		DN 40	J51
stainless steel 1.4404/316L and Hastelloy C276)		DN 50	J52
Certification acc. to NACE MR-0103	D08	DN 80	J53
Includes acceptance test certificate 3.1 accor-		DN 100	J54
ding to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		DN 125	J55
Oil- and grease-free cleaned version	E10	Flange according to ASME B16.5 RF 125 250 AA, in stainless steel 316L	
Oil- and grease-free cleaned and packed ver-	E10	(only in combination with "Z" at data position 9)	
sion, only for oxygen application, only inert fill		1", class 150	J6A
fluid may be used. Max. temperature: 60 °C		1", class 300	J6B
(140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certi-		1", class 400/600	J6C
ficate acc. to EN 10204-2.2		1", class 900/1500	J6D
Epoxy painting	E15	1½", class 150	J6E
Not possible with negative pressure service.		1½", class 300 1½", class 400/600	J6F
Color: transparent, coverage: front and rear of		1½", class 400/600 1½", class 900/1500	J6G J6H
the remote seal, capillary(ies) or connecting			
tube, process connection of the transmitter. With transmitters 7MF40 and 7MF42, only		Sealing surface B1 or ASME B16.5 RF 125 250 AA	J12
possible with process connection G½B accord-		Instead of sealing surface B2 and RFSF	
ing to EN 837-1.		(Only for wetted parts in Hastelloy C276	
		(2.4819), Tantal and Duplex 2205 (1.4462) and for sizes 2", 3", DN 50 and DN 80)	
			104
		Sealing surface RJF (groove) ASME B16.5	J24
		instead of sealing surface ASME B16.5 RF 125 250 AA	
		(only for wetted parts made of stainless steel 316L)	
		Flange acc. to JIS, in stainless steel 316L	
		(only in combination with "Z" at data position 9)	
		JIS DN 50, 10 K 316L	J7A
		JIS DN 50, 20 K 316L	J7B
		JIS DN 80, 10 K 316L	J7C
		JIS DN 80, 20 K 316L	J7D

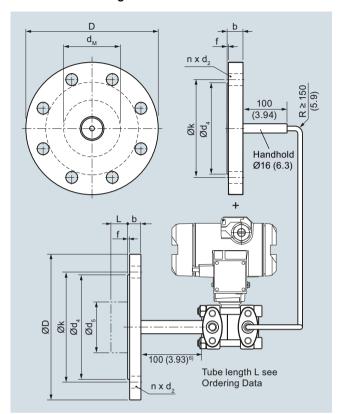
Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Please add "-Z" to Article No. and specify Order code.		Please add "-Z" to Article No. and specify Order code.	
Radial capillary pipe outlet		PVC protective tube	
for one-sided mounting	K01	over the spiral protective tube of the capillaries	
PE protective tube over the spiral protective tube of the capillaries (color: white)  1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft)  2.5 m (8.20 ft) 3.0 m (9.84 ft) 4.0 m (13.12 ft)  5.0 m (16.40 ft) 6.0 m (19.69 ft) 7.0 m (22.97 ft)	N20 N21 N22 N23 N24 N25 N26 N27 N28	(color: black)  1.0 m (3.28 ft)  1.6 m (5.25 ft)  2.0 m (6.56 ft)  2.5 m (8.20 ft)  3.0 m (9.84 ft)  4.0 m (13.12 ft)  5.0 m (16.40 ft)  6.0 m (19.69 ft)  7.0 m (22.97 ft)  8.0 m (26.25 ft)  9.0 m (29.53 ft)	N60 N61 N62 N63 N64 N65 N66 N67 N68 N69
8.0 m (26.25 ft)	N29	10.0 m (32.81 ft)	N71
9.0 m (29.53 ft) 10.0 m (32.81 ft)  PTFE protective tube over the spiral protective tube of the capillaries (color: transparent)	N30 N31	Elongated pipe, distance from transmitter process flange to flange is 150 mm instead of 100 mm, max. medium temperature 250 °C, observe the maximum permissible media temperature of the filling liquid.	R15
1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft) 2.5 m (8.20 ft) 3.0 m (9.84 ft)	N40 N41 N42 N43 N44	Elongated pipe, distance from transmitter process flange to flange is 100 mm instead of 100 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R20
4.0 m (13.12 ft) 5.0 m (16.40 ft) 6.0 m (19.69 ft) 7.0 m (22.97 ft) 8.0 m (26.25 ft) 9.0 m (29.53 ft)	N45 N46 N47 N48 N49 N50	Negative pressure service for use in low-pressure range for transmitters for • differential pressure  Extended negative pressure service for use in low-pressure range for transmitters for • differential pressure	V03
7.0 m (22.97 ft) 8.0 m (26.25 ft)	N48 N49	for use in low-pressure range for transmitters for	V53

Remote seals for transmitters and pressure gauges

### Diaphragm seals of flange design fixed connection and with capillary

### Dimensional drawings



Diaphragm seals of screwed design with flexible capillary, fixed connection, for connection to a SITRANS P pressure transmitter for differential pressure, dimensions in mm (inch)

### Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>M</sub>	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	
DN 50	PN 10/16/ 25/40	20	165	18	102	48.3	45 <sup>1)</sup>	2	125	4
	PN 100	28	195	26	102	48.3	45 <sup>1)</sup>	2	145	4
DN 80	PN 10/16/ 25/40	24	200	18	138	76	72 <sup>2)</sup>	2	160	8
	PN 100	32	230	26	138	76	72 <sup>2)</sup>	2	180	8
DN 100	PN 10/16	20	220	18	158	94	89	2	180	8
	PN 25/40	24	235	22	162	94	89	2	190	8

#### Connection to ASME B16.5

Nom. press.	b	D	d <sub>2</sub>	d <sub>4</sub>	<b>d</b> <sub>5</sub>	d <sub>M</sub>	f	k	n
lb/	mm	mm	mm	mm	mm	mm	mm	mm	
sq.m.	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	(inch)	
150	19.5	150	20	92	48.3	45 <sup>1)</sup>	2	120.5	4
	(0.77)	(5.91)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(80.0)	(4.74)	
300	22.7	165	20	92	48.3	45 <sup>1)</sup>	2	127	8
	(0.89)	(6.5)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(80.0)	(5)	
400/	32.4	165	20	92	48.3	45 <sup>1)</sup>	7	127	8
600	(1.28)	(6.5)	(0.79)	(3.62)	(1.9)	$(1.77)^{1)}$	(0.28)	(5)	
900/	45.1	215	26	92	48.3	45 <sup>1)</sup>	7	165	8
1500	(1.78)	(8.46)	(1.02)	(3.62)	(1.9)	$(1.77)^{1)}$	(0.28)	(6.5)	
150	24.3	190	20	127	76	72 <sup>2)</sup>	2	152.5	4
	(0.96)	(7.48)	(0.79)	(5)	(3)	$(2.83)^{2)}$	(80.0)	(6)	
300	29	210	22	127	76	72 <sup>2)</sup>	2	168.5	8
	(1.14)	(8.27)	(0.87)	(5)	(3)	$(2.83)^{2)}$	(80.0)	(6.63)	
150	24.3	230	20	158	94	89	2	190.5	8
	(0.96)	(9.06)	(0.79)	(6.22)	(3.69)	(3.50)	(80.0)	(7.5)	
300	32.2	255	22	158	94	89	2	200	8
	(1.27)	(10.04)	(0.79)	(6.22)	(3.69)	(3.50)	(80.0)	(7.87)	
	press. lb/ sq.in. 150 300 400/ 600 900/ 1500 150 300 150	press.         mm (inch)           150         19.5 (0.77)           300         22.7 (0.89)           400/ 600         32.4 (1.28)           900/ 1500         45.1 (1.78)           150         24.3 (0.96)           300         29 (1.14)           150         24.3 (0.96)           300         32.2 (0.96)           300         32.2	by ress.         mm         mm           lb/sq.in.         mm         (inch)           150         19.5         150           (0.77)         (5.91)           300         22.7         165           (0.89)         (6.5)           400/600         32.4         165           (1.28)         (6.5)           900/150         45.1         215           1500         24.3         190           (0.96)         (7.48)           300         29         210           (1.14)         (8.27)           150         24.3         230           (0.96)         (9.06)           300         32.2         255	Press.   P	press.           Ib/sq.in.         mm (inch)         (inch)	press.           Ib/sq.in.         mm         m	by ress.         wm         mm         <	No.   No.	No.   No.

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5  $\,$ 

 $d_M$ : Effective diaphragm diameter

 $<sup>^{1)}</sup>$  59 mm = 2.32 inch with tube length L = 0

<sup>2) 89</sup> mm =  $3\frac{1}{2}$  inch with tube length L = 0

Remote seals for transmitters and pressure gauges

### Diaphragm seal, screwed design directly mounted or/and with capillary

### Overview



Diaphragm seal, screwed gland design with inside diaphragm for gauge, absolute and differential pressure for direct mounting

Technical specifications			
Diaphragm seal, screwed gland w	ith inside diaphragm	Capillary	
Process connection	Nominal pressure	<ul><li>Length</li></ul>	Max. 10 m (32.8 ft)
• Male thread G½B to EN 837-1	PN 100, PN 250	<ul> <li>Internal diameter</li> </ul>	2 mm (0.079 inch)
• External thread ½-14" NPT-M	PN 100, PN 250	<ul> <li>Minimum bending radius</li> </ul>	150 mm (5.9 inch)
• open measurement flange		• Sheath	Stainless steel protective tube, mat. No. 1.4301/304
- DN 25	PN 10 PN 40	Filling liquid	• Silicone oil M5
- 1 inch	Class 150, class 300	Tilling liquid	• Silicone oil M50
Sealing face for open measurement flange			High-temperature oil
• For stainless steel, mat. no. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 250 AA		<ul> <li>Halocarbon oil (for measuring O<sub>2</sub>)</li> </ul>
•	ASINE B10.5 RF 125 250 AA		<ul> <li>Food oil (FDA listed)</li> </ul>
Materials     Lower section (in the case of process connection thread)	Stainless steel, Mat. no. 1.4404/316L	Max. recommended process temperature	170 °C (338 °F)
• Diaphragm	Stainless steel, Mat. no. 1.4404/316L	Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	<ul> <li>No coating</li> </ul>		More information can be found in
	<ul> <li>With PTFE coating</li> </ul>		the technical specifications of the pressure transmitters and in the
	Monel 400, mat. no. 2.4360		section "Technical data of filling
	Hastelloy C276, mat. no. 2.4819		liquid" in the introduction to the remote seals
	Hastelloy C4, mat. no. 2.4610	Weight	Approx. 1.5 kg (3.3 lb)
	Tantal	Certificates and approvals	
	Stainless steel 316L, gold plated, thickness approx. 25 µm	Classification according to pressure equipment directive	For gases of fluid group 1 and liquids of fluid group 1; complies
Top section (process connection in the case of an open measure- ment flange)	Stainless steel, mat. no. 1.4404/316L	(PED 97/23/EC)	with requirements of article 3, paragraph 3 (sound engineering practice)
Capillary	Stainless steel 1.4571/316Ti		

Viton or copper (in the case of

metal spring ring (silver-coated)

vacuum-free version) Viton (FKM) (standard) Teflon (PTFE)

• Sealing material on the process

• Sealing material between top and

connection

bottom section

Remote seals for transmitters and pressure gauges

# Diaphragm seal, screwed design directly mounted or/and with capillary

Selection and	Ordering data		Article	No. Ord.	Code	Selection and Ordering data	Artic	le No. (	Ord. Cod			
Remote seal, diaphragm	screwed gland	with inside				Remote seal, screwed gland with inside diaphragm						
Mounted on SITRANS P pressure transmitter for		<u> </u>			SITRANS P pressure transmitter 7 MF 4 9 3				Mounted on SITRANS P pressure transmitter for	7 M F 4 9 3 0 -		
• absolute pre 7MF423 8	3 and SITRANS P300, 7MF802 te pressure 3 and SITRANS P300, 7MF802 iction with Order code "V01" (vacuum-			03 and SITRANS P300, 7MF802 lute pressure 23 and SITRANS P300, 7MF802 unction with Order code "V01" (vacuum-					• gauge pressure 7MF403 and SITRANS P300, 7MF802 • absolute pressure 7MF423 and SITRANS P300, 7MF802 In conjunction with Order code "V01" (vacuum-proof design)			
Mounted on e	either side of SIT	RANS P	7 M F 4	933-		Mounted on either side of SITRANS P pressure transmitter for	7 M F	4933	-			
	pressure 7MF44	3 and				• differential pressure 7MF443 and 7MF54						
	e Article No. for the PIA Life Cycle P	ne online configu- Portal.		■ - ■B		Ocalian medicili behave a ber and bellem			В			
Туре	-					Sealing material between top and bottom section						
	nole hole 1x 1/8 NPT connection 316L		1 2			FKM (standard with diaphragm and 316L process connection) PTFE (standard with custom material with max.		2				
Other version, Order code ar Version:			9		H 1 Y	260 °C (500 °F))  Metal C- circlip, silver coated for > 260 °C (500 °F)) incl. high temperature-resistant		3				
Process conn	ection version					screwed gland						
Lower flange material	Process con- nection	Nominal diam- eter and pres- sure level				Filling liquid Silicone oil M5 Silicone oil M50		1 2				
316L/1.4404	Thread Thread	G½B/PN100	B C			<ul> <li>High-temperature oil</li> <li>Halocarbon oil (for measuring O<sub>2</sub>)<sup>1)</sup></li> </ul>		3 4				
316L/1.4404 316L/1.4404	Thread	G1/2B/PN250 1/2NPT-M/PN100	E			• Food oil (FDA-listed)		7				
316L/1.4404 316L/1.4404 316L/1.4404	Thread Thread Thread	½NPT-M/PN250 ½NPT-F/PN100 ½NPT-F/PN250	F H J			Other version, add Order code and plain text: filling liquid:		9	M 1			
316L/1.4404 316L/1.4404 316L/1.4404	open measure- ment flange open measure- ment flange open measure-	DN 25/ PN 10 40 1"/Class 150	N P Q			Capillary length <sup>2</sup> )  none, direct mounting  none, direct mounting with cooling element (not in conjunction with transmitter for differential pressure)  1.0 m (3.28 ft)		0 1				
PTFE	ment flange Thread	G1/2B/PN100	т			• 1.6 m (5.25 ft) • 2.5 m (8.20 ft)		3				
PTFE	open measure- ment flange	DN 25/ PN 10 40	U			• 4.0 m (13.1 ft)		5				
PTFE	open measure- ment flange		V			• 6.0 m (19.7 ft) • 8.0 m (26.25 ft)		6 7				
PTFE	open measure-	1"/Class 300	w			• 10.0 m (32.8 ft)		8				
Other version,	ment flange		z		J 1 Y	Special lengths for capillaries						
Order code ar Lower flange	nd plain text:				• • • •	• 2.0 m (6.56 ft) • 3.0 m (9.84 ft)		9				
Process conne	ection:;					• 5.0 m (16.40 ft)		9				
	eter/pressure leve	el:				• 7.0 m (23.97 ft) • 9.0 m (29.53 ft)		9				
Diaphragm m Stainless steel 316L stainless Monel 400 Hastelloy C270	316L steel with PTFE	film	A E G J			<ol> <li>Oil- and grease- free cleaning to DIN 25410, level included in the scope of delivery.</li> <li>Max. capillary length, see section "Technical desc</li> </ol>			ing			
Hastelloy C4 Tantalum Stainless steel thickness app	316L, gold plate rox. 25 μm	d,	U K S									
Other version, Order code ar Diaphragm ma	add nd plain text:		Z		K 1 Y							

Remote seals for transmitters and pressure gauges

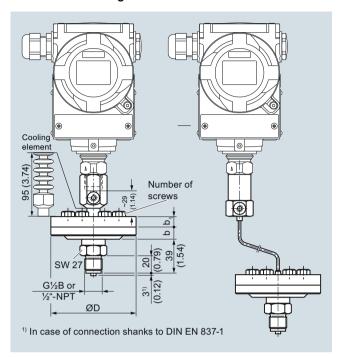
Diaphragm seal, screwed design directly mounted or/and with capillary

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	B20	<b>PE protective tube</b> over the spiral protective tube of the capillaries (color: white)	
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	C10	1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft) 2.5 m (8.20 ft)	N20 N21 N22 N23
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	3.0 m (9.84 ft) 4.0 m (13.12 ft)	N24 N25
Inspection certificate to EN 10204, section 3.1	C12	5.0 m (16.40 ft) 6.0 m (19.69 ft)	N26 N27
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17	7.0 m (22.97 ft) 8.0 m (26.25 ft) 9.0 m (29.53 ft) 10.0 m (32.81 ft)	N28 N29 N30 N31
Functional safety certificate ("SIL 2") to IEC 61508  (Only in conjunction with the Order code "C20" in the conjunction of CITRANC P. DOWN transpired to the conjunction of the conjunctio	C20	PTFE protective tube over the spiral protective tube of the capillaries	Not
in the case of SITRANS P DSIII transmitter)  Functional safety certificate ("SIL 2/3") to IEC 61508	C23	(color: transparent) 1.0 m (3.28 ft)	N40
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)		1.6 m (5.25 ft) 2.0 m (6.56 ft)	N41 N42
Certification acc. to NACE MR-0175	D07	2.5 m (8.20 ft)	N43
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		3.0 m (9.84 ft) 4.0 m (13.12 ft) 5.0 m (16.40 ft)	N44 N45 N46
Certification acc. to NACE MR-0103	D08	6.0 m (19.69 ft)	N47
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		7.0 m (22.97 ft) 8.0 m (26.25 ft) 9.0 m (29.53 ft)	N48 N49 N50
Oil- and grease-free cleaned version	E10	10.0 m (32.81 ft)	N51
Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2		PVC protective tube over the spiral protective tube of the capillaries (color: black)  1.0 m (3.28 ft) 1.6 m (5.25 ft)	N60 N61
Epoxy painting	E15	1.6 m (5.25 ft) 2.0 m (6.56 ft)	N62
Not possible with negative pressure service.		2.5 m (8.20 ft)	N63
Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter.		3.0 m (9.84 ft) 4.0 m (13.12 ft)	N64 N65
With transmitters 7MF40 and 7MF42, only possible with process connection G½B according to EN 837-1.		5.0 m (16.40 ft) 6.0 m (19.69 ft)	N66 N67
One-sided mounting on differential pressure		7.0 m (22.97 ft)	N68
transmitters (only for 7MF4930)		8.0 m (26.25 ft) 9.0 m (29.53 ft)	N69 N70
on high-pressure side	H10	10.0 m (32.81 ft)	N71
on low-pressure side	H11	Negative pressure service	
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	J14	for use in low-pressure range for transmitters for • gauge and absolute pressure from the pressure series	V01
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 250 AA (only for wetted parts made of stainless steel 316L)	J24	differential pressure  Extended negative pressure service for use in low-pressure range for transmitters for     gauge and absolute pressure from the pressure series	V51
Sealing surface with spring according to EN 1092-1, form C, (previously DIN 2512, form F) in stainless steel 316L		• differential pressure	V53
DN 25 DN 40	J30 J31		

Remote seals for transmitters and pressure gauges

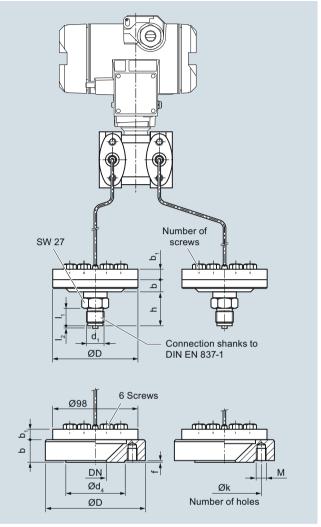
### Diaphragm seal, screwed design directly mounted or/and with capillary

### Dimensional drawings



Diaphragm seal, screwed gland with inside diaphragm, for gauge and absolute pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

Range	D mm	b mm	b <sub>1</sub> mm	Number of screws
up to 100 bar	98	14	16	6
up to 250 bar	98	14	20	12



Diaphragm seal, screwed gland with inside diaphragm, for differential pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

	Nominal	D	d <sub>4</sub>	k	М	Number of holes	b	b <sub>1</sub>	f
nal diam- eter	pressure	mm	mm	mm		or noies	mm	mm	mm
DN 25	PN 10/16/ 25/40	115	68	85	M12	4	26	12	2
1 inch	150 lb/sq.in	108	50.8	79.2	M12	4	22	12	1.6
1 inch	300 lb/sq.in	124	50.8	88.9	M16	4	22	12	1.6

• Clamp connection

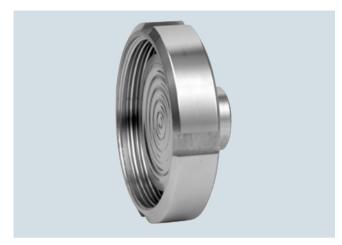
**EHEDG** 

#### **Pressure Measurement**

Remote seals for transmitters and pressure gauges

### Quick-release diaphragm seals

#### Overview



Quick-release diaphragm seals, to DIN 11851 with slotted union nut



Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals are available for the following SITRANS P pressure transmitter series:

- For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- For differential pressure and flow: P500, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- The quick-release remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismounting is possible for cleaning.

### Technical specifications

Quick-release diaphragm seal								
Connection, nominal diameter	Nominal pressure							
For pressure								
• To DIN 11851 with slotted union nut								
- DN 25	PN 40							
- DN 32	PN 40							
- DN 40	PN 40							
- DN 50	PN 25							
- DN 65	PN 25							
- DN 80	PN 25							
• To DIN 11851 with threaded socket								
- DN 25	PN 40							
- DN 32	PN 40							
- DN 40	PN 40							
- DN 50	PN 25							
- DN 65	PN 25							
- DN 80	PN 25							

- 1½ inch	PN 16
- 2 inch	PN 16
- 2½ inch	PN 16
- 3 inch	PN 10
For differential pressure and flow	114.16
To DIN 11851 with slotted union nut	
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
To DIN 11851 with threaded socket	FIN 25
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
Clamp connection	DN 40
- 2 inch	PN 16
- 2½ inch	PN 16
- 3 inch	PN 10
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B 16.5RF 125 250 AA
• For the other materials	To EN 1092-1, form B2 or
	ASME B16.5 RFSF
Materials	
Main body	Stainless steel 316L
Wetted parts	Stainless steel 316L
Capillary	Stainless steel, mat. No. 1.4571/316Ti
Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/316
Maximum pressure	See above and the technical data of the pressure transmitter
Tube length	Without tube
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
Internal diameter	2 mm (0.079 inch)
Minimum bending radius	150 mm (5.9 inch)
Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/316
Filling liquid	Food oil (FDA listed)
Permissible ambient temperature	Dependent on the pressure trans- mitter and the filling liquid of the remote seal
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)
Certificates and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liq- uids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Complies with EHEDG recom-

mendations

### Remote seals for transmitters and pressure gauges

Selection and Ordering data	Article	No. Or	d. code	Selection and Ordering data	Ord. code
Quick-release diaphragm seal	7 M F 4	940-		Further designs	
for SITRANS P pressure transmitters for pressure 7MF403 and 7MF423 together with Order code "V01" (Negative pressure ser-	== A 0	- ■ B	-	Please add "-Z" to Article No. and specify Order code.	
with Order code "V01" (Negative pressure service) and 7MF802 <sup>1)</sup> ; must be ordered separately Filling liquid: Food oil (FDA listed)			Ш	Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	B20
Material: Stainless steel, mat. No. 1.4435  Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Ш	Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11
Nom. diam. Nom. press.				Inspection certificate to EN 10204, section 3.1	C12
<ul> <li>Connection to DIN 11851 with slotted union nut</li> <li>DN 25 PN 40</li> <li>DN 32 PN 40</li> </ul>	1 B 1 C		Ш	2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17
- DN 40 PN 40 - DN 50 PN 25 - DN 65 PN 25	1 D 1 E 1 F		Ш	Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20"	C20
- DN 80 PN 25 • Connection to DIN 11851 with screw necks	1 G			in the case of SITRANS P DSIII transmitter)	000
- DN 25 PN 40 - DN 32 PN 40	2 B 2 C		Ш	Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23"	C23
- DN 40 PN 40 - DN 50 PN 25	2 D 2 E			in the case of SITRANS P DSIII transmitter)  One-sided mounting on differential pressure	
- DN 65 PN 25 - DN 80 PN 25	2 F 2 G			transmitters (only for 7MF4940)	
• Tri-Clamp connection to DIN 32676/ISO 2852 - DN 40/1½ inch PN 16	4 L		Ш	on high-pressure side on low-pressure side	H10 H11
- DN 50/2 inch PN 16 - DN 65/2½ inch PN 16 - DN 80/3 inch PN 10	4 M 4 N 4 P		Ш	PE protective tube over the spiral protective tube of the capillaries (color: white)	
Other version Add Order codes and plain text: Process connection:, Nominal diameter:; Nominal pressure:	9 A		H 1 Y	1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft)	N20 N21 N22
Filling liquid				2.5 m (8.20 ft) 3.0 m (9.84 ft)	N23 N24
• Food oil (FDA listed)		7		4.0 m (13.12 ft)	N25
Other version Add Order code and plain text:		9	M 1 Y	5.0 m (16.40 ft)	N26
Filling liquid:				6.0 m (19.69 ft)	N27
Connection to pressure transmitter				7.0 m (22.97 ft)	N28
• direct		0		8.0 m (26.25 ft)	N29
through capillary, length: <sup>2)</sup>				9.0 m (29.53 ft)	N30
• 1.0 m (3.28 ft) • 1.6 m (5.25 ft)		2		10.0 m (32.81 ft)	N31
• 2.5 m (8.20 ft)		3 4 5		PTFE protective tube over the spiral protective tube of the capillaries	
• 4.0 m (13.1 ft) • 6.0 m (19.7 ft)		6		(color: transparent) 1.0 m (3.28 ft)	N40
• 8.0 m (26.25 ft)		7		1.0 m (3.28 ft) 1.6 m (5.25 ft)	N40 N41
• 10.0 m (32.8 ft)		8		2.0 m (6.56 ft)	N42
Special lengths for capillaries				2.5 m (8.20 ft)	N43
• 2.0 m (6.56 ft)		9	N1C	3.0 m (9.84 ft)	N44
• 3.0 m (9.84 ft)		9	N1E	4.0 m (13.12 ft)	N45
• 5.0 m (16.40 ft)		9	N 1 G	5.0 m (16.40 ft)	N46
• 7.0 m (23.97 ft)		9	N 1 J	6.0 m (19.69 ft)	N47
• 9.0 m (29.53 ft)		9	N1L	7.0 m (22.97 ft)	N48
1) With 7MF802 and the measuring cells Q, S, T a	and U als	so order	the	8.0 m (26.25 ft)	N49
vacuum-tight version.  2) Max. capillary length, see section "Technical desc	ription"			9.0 m (29.53 ft) 10.0 m (32.81 ft)	N50 N51

<sup>2)</sup> Max. capillary length, see section "Technical description"

Remote seals for transmitters and pressure gauges

0.1 10.1	0.1.1
Selection and Ordering data	Ord. code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
PVC protective tube	
over the spiral protective tube of the capillaries (color: black)	
1.0 m (3.28 ft)	N60
1.6 m (5.25 ft)	N61
2.0 m (6.56 ft)	N62
2.5 m (8.20 ft)	N63
3.0 m (9.84 ft)	N64
4.0 m (13.12 ft)	N65
5.0 m (16.40 ft)	N66
6.0 m (19.69 ft)	N67
7.0 m (22.97 ft)	N68
8.0 m (26.25 ft)	N69
9.0 m (29.53 ft)	N70
10.0 m (32.81 ft)	N71
Cooling element	R22
max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	
Negative pressure service	
for use in low-pressure range for transmitters for	
• gauge and absolute pressure from the pressure series	V01
Extended negative pressure service	
for use in low-pressure range for transmitters for	
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V51

### Remote seals for transmitters and pressure gauges

Selection and Ordering data	Article No	o. Or	Selection and		
Quick-release diaphragm seal	7 M F 4 9	43-			Further design
for SITRANS P pressure transmitters for pressure for differential pressure and flow, type 7MF443 and 7MF54; order separately Filling liquid: Food oil (FDA listed) Material: Stainless steel, mat. No. 1.4435	- A 0	- ■ B	Ī	Ī	Please add "-Z" code.  Remote seal n Attached out of
Delivery unit: 2 off					and order numb
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					Quality inspec factory calibra
Nom. diam. Nom. press.  • Connection to DIN 11851 with slotted union nut					Inspection cer to EN 10204, se
- DN 50 PN 25	1 E				2.2 Certificate
- DN 65 PN 25	1 F				Only in conjunc
- DN 80 PN 25	1 G				uid (FDA listed)
Connection to DIN 11851 with threaded socket					Functional saf
- DN 50 PN 25	2 E				(Only in conjund
- DN 65 PN 25	2 F				in the case of S
- DN 80 PN 25 • Tri-Clamp connection to DIN 32676/ ISO 2852	2 G				Functional saf
- DN 50/2 inch PN 16	4 M				IEC 61508
- DN 65/2½ inch PN 16	4 N				(Only in conjuning the case of S
- DN 80/3 inch PN 10	4 P				PE protective
Other version					over the spiral
Add Order codes and plain text:					(color: white)
Process connection:, Nominal diameter:; Nominal pressure:	9 A		н	1 Y	1.0 m (3.28 ft
Filling liquid					1.6 m (5.25 ft
Food oil (FDA listed)	7				2.0 m (6.56 ft
Other version	9		M	1 Y	2.5 m (8.20 ft
Add Order code and plain text:					3.0 m (9.84 ft 4.0 m (13.12
Filling liquid:	_				
Connection to transmitter					5.0 m (16.40 6.0 m (19.69
through capillary, Length: 1)					7.0 m (22.97
• 1.0 m (3.28 ft)		2			
• 1.6 m (5.25 ft) • 2.5 m (8.20 ft)		3 4			8.0 m (26.25 9.0 m (29.53
• 4.0 m (13.1 ft)		5			10.0 m (32.81
• 6.0 m (19.7 ft)		6			PTFE protective
• 8.0 m (26.25 ft)		7			over the spiral
• 10.0 m (32.8 ft)		8			(color: transpar
Special lengths for capillaries					1.0 m (3.28 ft
• 2.0 m (6.56 ft)		9	N	1 C	1.6 m (5.25 ft
• 3.0 m (9.84 ft)		9		1 E	2.0 m (6.56 ft
• 5.0 m (16.40 ft)		9	N	1 G	2.5 m (8.20 ft
• 7.0 m (23.97 ft)		9		1 J	3.0 m (9.84 ft
• 9.0 m (29.53 ft)		9	N	1 L	4.0 m (13.12
1) Max. capillary length, see section "Technical des	cription"				5.0 m (16.40 6.0 m (19.69

Calcation and Ordering data	Ouder eads
Selection and Ordering data	Order code
Further designs	
Please add " <b>-Z</b> " to Article No. and specify Order code.	
Remote seal nameplate	B20
Attached out of stainless steel, contains MLFB and order number of the remote seal	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11
Inspection certificate to EN 10204, section 3.1	C12
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17
Functional safety certificate ("SIL 2") to IEC 61508	C20
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	
Functional safety certificate ("SIL 2/3") to IEC 61508	C23
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	
PE protective tube	
over the spiral protective tube of the capillaries (color: white)	
1.0 m (3.28 ft)	N20
1.6 m (5.25 ft)	N21
2.0 m (6.56 ft)	N22
2.5 m (8.20 ft)	N23
3.0 m (9.84 ft) 4.0 m (13.12 ft)	N24 N25
5.0 m (16.40 ft)	N26
6.0 m (19.69 ft)	N27
7.0 m (22.97 ft)	N28
8.0 m (26.25 ft)	N29
9.0 m (29.53 ft)	N30
10.0 m (32.81 ft)	N31
PTFE protective tube	
over the spiral protective tube of the capillaries (color: transparent)	
1.0 m (3.28 ft)	N40
1.6 m (5.25 ft) 2.0 m (6.56 ft)	N41 N42
2.5 m (8.20 ft)	N43
3.0 m (9.84 ft)	N44
4.0 m (13.12 ft)	N45
5.0 m (16.40 ft)	N46
6.0 m (19.69 ft)	N47
7.0 m (22.97 ft)	N48
8.0 m (26.25 ft)	N49
9.0 m (29.53 ft) 10.0 m (32.81 ft)	N50 N51
- (,	

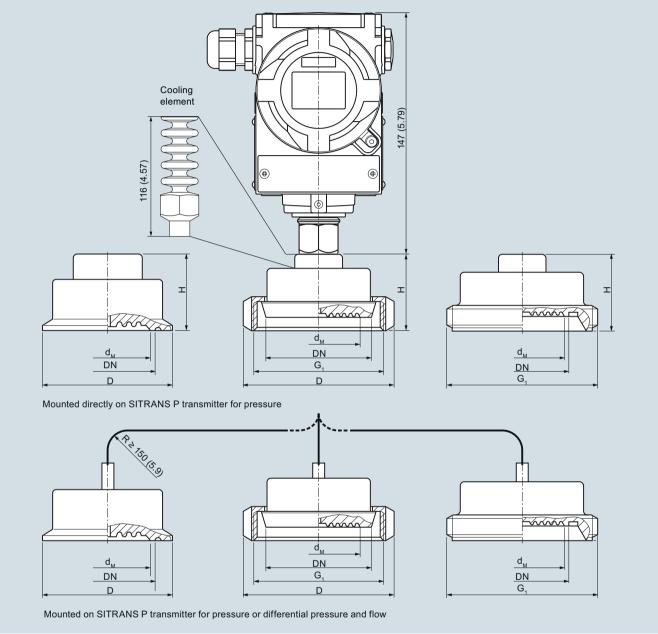
Remote seals for transmitters and pressure gauges

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
PVC protective tube over the spiral protective tube of the capillaries (color: black)	
1.0 m (3.28 ft) 1.6 m (5.25 ft) 2.0 m (6.56 ft)	N60 N61 N62
2.5 m (8.20 ft) 3.0 m (9.84 ft) 4.0 m (13.12 ft)	N63 N64 N65
5.0 m (16.40 ft) 6.0 m (19.69 ft) 7.0 m (22.97 ft)	N66 N67 N68
8.0 m (26.25 ft) 9.0 m (29.53 ft) 10.0 m (32.81 ft)	N69 N70 N71
Negative pressure service for use in low-pressure range for transmitters for • differential pressure	V03
Extended negative pressure service for use in low-pressure range for transmitters for • differential pressure	V53

Remote seals for transmitters and pressure gauges

Quick-release diaphragm seals

### Dimensional drawings



Quick-release diaphragm seal, dimensions in mm (inch)

Clamp connection (left)									
DN	Ød	м	ØD		н				
40 (1½ inch)	32	(1.26)	50.5	(2)	35	(1.38)			
50 (2 inch)	40	(1.57)	64	(2.52)	35	(1.38)			
65 (2½ inch)	52	(2.05)	77.5	(3.05)	35	(1.38)			
80 (3 inch)	72	(2.83)	91	(3.58)	35	(1.38)			

Connection to DIN 11851 with slotted union nut (center)								
DN	$Ød_{M}$	ØD	Н	G <sub>1</sub>				
25	25	63	36	Rd 52x1/6				
32	32	70	36	Rd 52x1/6				
40	40	78	36	Rd 65x1/6				
50	52	112	36	Rd 78x1/6				
65	65	112	36	Rd 95x1/6				
80	72	127	36	Rd 110x1/6				
25	25	63	36	Rd 52x1/6				

Connection to DIN 11851 with threaded socket (right)						
DN	$Ød_{M}$	Н	G <sub>1</sub>			
25	25	36	Rd 52x1/6			
32	32	36	Rd 52x1/6			
40	40	36	Rd 65x1/6			
50	52	36	Rd 78x1/6			
65	65	36	Rd 95x1/6			
80	72	36	Rd 110x1/6			

 $d_{\mathsf{M}}$  Effective diaphragm diameter

Remote seals for transmitters and pressure gauges

### Miniature diaphragm seals

#### Overview



Miniature diaphragm seals

The miniature diaphragm seals are available for the following SITRANS P pressure transmitter series for pressure:

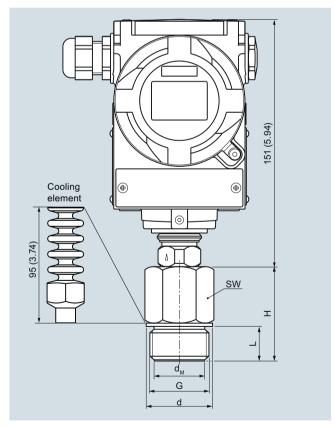
 P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus

Suitable for high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

#### Design

- Flush-mounted diaphragm
- No dead spaces
- Fixed threaded stems

#### Dimensional drawings



Miniature diaphragm seal, dimensions in mm (inch)

G	Ø	d <sub>M</sub>	SW		Ç	ð d		L	Н		
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	
G1B	25	(0.98)	41	(1.61)	39	(1.53)	28	(1.1)	56	(2.21)	
G11/2B	40	(1.57)	55	(2.17)	60	(2.36)	30	(1.18)	50	(1.97)	
G2B	50	(1.97)	60	(2.36)	70	(2.76)	30	(1.18)	63	(2.48)	

G	Q	∂ d <sub>M</sub>	SW			L	Н		
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	
1"-NPT	27	(1.06)	41	(1.61)	25	(0.98)	40	(1.57)	
11/2"-NPT	34	(1.34)	55	(2.17)	26	(1.02)	45	(1.77)	
2"-NPT	46	(1.81)	65	(2.56)	26	(1.02)	45	(1.77)	

d<sub>M</sub>: Effective diaphragm diameter

#### Technical specifications

#### Miniature diaphragm seals

Span with

- G1B and 1"-NPT
- G11/2B and 11/2"-NPT
- G2B and 2"-NPT
- Filling liquid

i iiiiig iiquiu

- Material
- Main body
- Diaphragm

Maximum pressure

Temperature of use
Temperature range of medium

Max. recommended process temperature

#### Weight

- G1B and 1"-NPT
- G1½B and 1½"-NPT
- G2B and 2"-NPT

Certificate and approvals
Classification according to
pressure equipment directive
(DRGL 97/23/EC)

- > 6 bar (> 87 psi)
- > 2 bar (> 29 psi)
- > 600 mbar (> 8.7 psi)

Silicone oil M5 or food oil (FDA listed)

Stainl. steel mat No. 1.4404/316L or Hastelloy C276, mat No. 2.4819 Stainl. steel mat No. 1.4404 / 316L or Hastelloy C276, mat. No. 2.4819

100% of nominal pressure of pressure transmitter, up to maximum of PN 400 (5802 psi) (depending on the seal used)

Same as pressure transmitter Same as pressure transmitter 150 °C (302 °F)

Approx. 0.3 kg (approx. 0.66 lb) Approx. 0.5 kg (approx. 1.10 lb) Approx. 0.8 kg (approx. 1.76 lb)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Remote seals for transmitters and pressure gauges

### Miniature diaphragm seals

Selection and Orderin	Article	e N	lo. Ord.	. C	Ю	de	
Miniature diaphragm	7 M F	4 9	60-				
directly fitted to SITRANS P pressure transmitters for pressure; type, 7MF403 and 7MF423 together with Order code "V01" (vacuum-proof design) and 7MF802 <sup>1)</sup> ; must be ordered separately Material: Stainless steel, mat. No. 1.4404/316L Nominal pressure, see "Pressure transmitters"							Ī
Click on the Article N ration in the PIA Life	No. for the online configu- Cycle Portal.						
Process connection  G1B  G1½B  G2B  1" - NPT  1½" - NPT  2" - NPT  Other version, add Ord Process connection:	er code and plain text:	C D E K L M			J	1	Y
Material							
Remote seal enclosure	Wetted parts materials						
Stainless steel mat. No. 1.4404/316L	Stainless steel mat. No. 1.4404/316L	A					
Hastelloy C276	Hastelloy C276	J					
Stainless steel mat. No. 1.4404/316L	Other version Add Order code and plain text: Wetted parts materials	Z			K	1	Y
Wetted parts materials • Stainless steel 316L Other version, add Ord Wetted parts materials:	er code and plain text:	A Z			K	1	Y
Filling liquid  • Silicone oil M5  • Food oil (FDA listed) Other version, add Ord Filling liquid:	er code and plain text:		1 7 9		M	1	Y

With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code.	
Remote seal nameplate	B20
Attached out of stainless steel, contains MLFB and order number of the remote seal	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11
nspection certificate o EN 10204, section 3.1	C12
2.2 Certificate of FDA approval of fill oil	C17
Only in conjunction with "Food-grade oil" fill liq- uid (FDA listed)"	
Functional safety certificate ("SIL 2") to EC 61508	C20
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	
Functional safety certificate ("SIL 2/3") to EC 61508	C23
(Only in conjunction with the Order code "C23" n the case of SITRANS P DSIII transmitter)	
Certification acc. to NACE MR-0175	D07
ncludes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	
Certification acc. to NACE MR-0103	D08
ncludes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the illing liquid.	R22
Negative pressure service	
for use in low-pressure range for transmitters for • gauge and absolute pressure from the pressu- re series	V01
Extended negative pressure service	
for use in low-pressure range for transmitters for	
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V51

Remote seals for transmitters and pressure gauges

#### Flushing rings for diaphragm seals

#### Overview



#### Flushing ring

Flushing rings are required for flange-mounted and sandwichtype remote seals (Article No. 7MF4900 ... 7MF4923) if the danger exists that the process conditions and the geometry of the connection could cause the medium to form deposits or blockages.

The flushing ring is clamped between the process flange and the remote seal.

Deposits can be flushed away from the diaphragm through the holes in the side, or the pressure volume can be vented. Different nominal diameters and forms permit adaptation to the respective process flange.

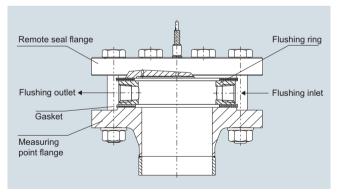
#### **Process connection**

For flanges to EN and ASME: DN 50, 80, 100, 125; PN 16 ... 100 or DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

#### Standard design

Material: CrNi-Stahl, mat. No. 1.4404/316L Sealing faces and flushing holes: See Selection and Ordering data

#### Design



Installation example

### Technical specifications

#### Flushing ring for remote seals of sandwich and flange design Nominal diameter Nominal pressure • DN 50 PN 16 ... PN 100 • DN 80 PN 16 ... PN 100 • DN 100 PN 16 ... PN 100 • DN 125 PN 16 ... PN 100 Class 150 ... class 600 • 2 inch Class 150 ... class 600 • 3 inch Class 150 ... class 600 • 4 inch • 5 inch Class 150 ... class 600 Sealing face • To EN 1092-1 Form B1 Form B2 Form D/Form D Form C/Form C Form C/Form C Form E Form F • To ASME B16.5 RF 125 ... 250 AA **RFSF** RJF ring groove Flushing holes (2 off), female • G1/4 thread • G1/2

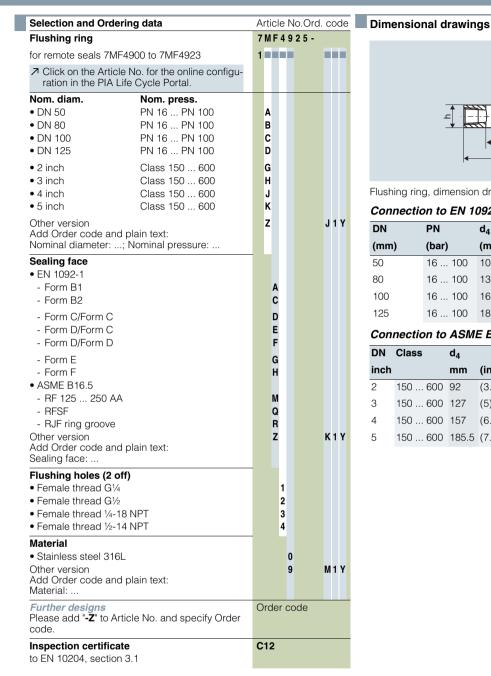
Stainless steel 1.4404/316L

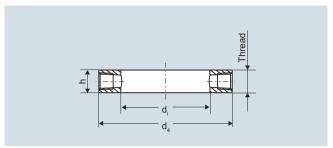
• 1/4-18 NPT

• ½-14 NPT

Remote seals for transmitters and pressure gauges

### Flushing rings for diaphragm seals





Flushing ring, dimension drawing

#### Connection to EN 1092-1

DN	PN	d <sub>4</sub>	d <sub>i</sub>	h	Weight
(mm)	(bar)	(mm)	(mm)	(mm)	(kg)
50	16 100	102	62	30	1.10
80	16 100	138	92	30	1.90
100	16 100	162	92	30	3.15
125	16 100	188	126	30	3.50

#### Connection to ASME B 16.5

DN	Class	d <sub>4</sub>		d <sub>i</sub>		h		Weight	
inch		mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)
2	150 600	92	(3.62)	62	(2.44)	30	(1.18)	0.60	(1.32)
3	150 600	127	(5)	92	(3.62)	30	(1.18)	1.05	(2.31)
4	150 600	157	(6.18)	92	(3.62)	30	(1.18)	2.85	(6.28)
5	150 600	185.5	(7.3)	126	(4.96)	30	(1.18)	3.30	(7.28)

Remote seals for transmitters and pressure gauges

#### Inline seals for flange-mounting

#### Overview



Inline seals for flange-mounting

The inline seal is completely integrated in the process line. It is particularly suitable for flowing and highly viscous media.

The inline remote seal consists of a cylindrical jacket into which a thin-walled pipe is welded. It is clamped directly between two flanges in the pipeline.

### Design

- Inline seals for flange-mounting (flange design) to EN/ASME for SITRANS P pressure transmitters
  - For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
  - For differential pressure and flow: DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus and P500
- Sealing face to EN 1092-1 or ASME B16.5
- Connection to the transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical data for details of materials used for the wetted parts
- Material used for the capillary, the guard sleeve, the seal's main body and the measuring cell: Stainless steel, mat.-No. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, food oil (FDA listed) or glycerin/water (not suitable for uses in low-pressure range)

#### Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes either directly or through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

#### Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof remote seal (see Selection and Ordering data).

### Technical specifications

<u> </u>					
Inline seals for flange-mounting					
Nominal diameter	Nominal pressure				
• DN 25	PN 6 PN 100				
• DN 40	PN 6 PN 100				
• DN 50	PN 6 PN 100				
• DN 80	PN 6 PN 100				
• DN 100	PN 6 PN 100				
• 1 inch	Class 150 class 2500				
• 1½ inch	Class 150 class 2500				
• 2 inch	Class 150 class 2500				
• 3 inch	Class 150 class 2500				
• 4 inch	Class 150 class 2500				
Process connection	Flange to EN 1092-1 or ASME B 16.5				
Sealing face	To EN 1092-1, form B1 or to ASME B16.5 RF 125 250 A or RFSF				
Materials					
Main body	Stainless steel 1.4404/316L				
Diaphragm	Stainless steel 1.4404/316L				
<ul> <li>Wetted parts</li> </ul>	Stainless steel 1.4404/316L				
	Without coating				
	<ul> <li>ECTFE coating (for vacuum on request)</li> </ul>				
	<ul> <li>PFA coating</li> </ul>				
	Monel 400, mat. No. 2.4360				
	Hastelloy C276, mat. No. 2.4819				
	Hastelloy C4, mat. No. 2.4610				
	Tantalum				
Capillary	Stainless steel, mat. No. 1.4571/316Ti				
• Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/316				
Capillary					
• Length	Max. 10 m (32.8 ft)				
Internal diameter	2 mm (0.079 inch)				
Minimum bending radius	150 mm (5.9 inch)				
Filling liquid	Silicone oil M5				
	Silicone oil M50				
	High-temperature oil				
	Halocarbon oil				
	Food oil (FDA listed)				
Permissible ambient temperature	See pressure transmitters, see fill ing liquid				
Weight	Approx. 4 kg (8.82 lb)				

#### Certificates and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)

For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

Remote seals for transmitters and pressure gauges

### Inline seals for flange-mounting

Selection and Or	dering data	Article	e No.O	rd. code
	nge-mounting for			
for gauge pressure 7MF403 and 7MF423 together with Order code "V01" (Negative pressure service) and 7MF802 <sup>1</sup> ); must be ordered separately, scope of delivery: 1 off			4980	-
of delivery: 1 pair stainless steel, ma Process connection B16.5; sealing face	essure and flow 4; order separately, scope (set); Material: Completely of at. No. 1.4404/316L; on to EN 1092-1 or ASME e to EN 1092-1, form B1, RF 125 250 AA	7 M F	4983	-
	icle No. for the online configu- A Life Cycle Portal.	1==	0 = - =	В
<ul> <li>DN 25</li> <li>DN 40</li> <li>DN 50</li> <li>DN 80</li> <li>DN 100</li> </ul>	r and nominal pressure PN 6 100	B D E G		
• 1 inch • 1½ inch • 2 inch • 3 inch • 4 inch Other version Add Order code a	Class 150 2500 Class 150 2500 Class 150 2500 Class 150 2500 Class 150 2500	L M N P Q		J 1 Y
Wetted parts mal  Stainless steel 3  Without coatin  With PFA coati  With ECTFE cc  Monel 400, mat.  Hastelloy C276,  Hastelloy C4, max  Tantalum	erials 16L g ng ng sating <sup>2)</sup> No. 2.4360 mat. No. 2.4819	A D F G J U K		
Other version Add Order code a Wetted parts mate Filling liquid Silicone oil M5 Silicone oil M50 High-temperatur	rials:	Z	1 2 3	K 1 Y
	for measuring O <sub>2</sub> ) <sup>3)</sup> ted)		3 4 7 9	M 1 Y

Selection and Ordering data	Article No.Ord. code
Inline seal for flange-mounting for SITRANS P pressure transmitters	
for gauge pressure 7MF403 and 7MF423 together with Order code "V01" (Negative pressure service) and 7MF802 1); must be ordered separately, scope of delivery: 1 off	7 M F 4 9 8 0 -
for differential pressure and flow 7MF4433 or 7MF54; order separately, scope of delivery: 1 pair (set); Material: Completely of stainless steel, mat. No. 1.4404/316L; Process connection to EN 1092-1 or ASME B16.5; sealing face to EN 1092-1, form B1, or to ASME B16.5 RF 125 250 AA	7 M F 4 9 8 3 -
	1 = 0 = - B
Connection to transmitter  • direct (only for 7MF4980) through capillary, length: 4)  • 1.0 m (3.28 ft)  • 1.6 m (5.25 ft)  • 2.5 m (8.20 ft)  • 4.0 m (13.1 ft)  • 6.0 m (19.7 ft)  • 8.0 m (26.25 ft)  • 10.0 m (32.8 ft)  Special lengths for capillaries	0 2 3 4 5 6 7 8
• 2.0 m (6.56 ft) • 3.0 m (9.84 ft) • 5.0 m (16.40 ft) • 7.0 m (23.97 ft) • 9.0 m (29.53 ft)	9 N1C 9 N1E 9 N1G 9 N1J 9 N1L
only for 7MF4983	
• 11.0 m (36.09 ft) • 12.0 m (39.37 ft) • 13.0 m (42.65 ft) • 14.0 m (45.93 ft)	9 N1N 9 N1P 9 N1Q 9 N1R 9 N1S
• 15.0 m (49.21 ft)	9 N1S

With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
 For vacuum on request.
 Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
 Max. capillary length, see section "Technical description"

Remote seals for transmitters and pressure gauges

### Inline seals for flange-mounting

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Please add "-Z" to Article No. and specify Order code.		Please add "-Z" to Article No. and specify Order code.	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation)		PE protective tube over the spiral protective tube of the capillaries (color: white)	
<ul><li>Pressure and absolute pressure</li><li>for differential pressure transmitters</li></ul>	A01 A02	1.0 m (3.28 ft) 1.6 m (5.25 ft)	N20 N21
Remote seal nameplate	B20	2.0 m (6.56 ft)	N22
Attached out of stainless steel, contains MLFB and order number of the remote seal		2.5 m (8.20 ft) 3.0 m (9.84 ft)	N23 N24
Oil- and grease-free cleaned version	C10	4.0 m (13.12 ft)	N25
Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2		5.0 m (16.40 ft) 6.0 m (19.69 ft) 7.0 m (22.97 ft)	N26 N27 N28
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	8.0 m (26.25 ft) 9.0 m (29.53 ft)	N29 N30
Inspection certificate to EN 10204, section 3.1	C12	10.0 m (32.81 ft) only for 7MF4983	N31
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17	11.0 m (36.09 ft) 12.0 m (39.37 ft) 13.0 m (42.65 ft)	N32 N33 N34
Functional safety certificate ("SIL 2") to IEC 61508	C20	14.0 m (45.93 ft) 15.0 m (49.21 ft)	N35 N36
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)		PTFE protective tube	
Functional safety certificate ("SIL 2/3") to IEC 61508	C23	over the spiral protective tube of the capillaries (color: transparent)	
Certification acc. to NACE MR-0175	D07	1.0 m (3.28 ft) 1.6 m (5.25 ft)	N40 N41
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)		2.0 m (6.56 ft)	N42
Certification acc. to NACE MR-0103	D08	2.5 m (8.20 ft) 3.0 m (9.84 ft)	N43 N44
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	500	4.0 m (13.12 ft) 5.0 m (16.40 ft)	N45 N46
Oil- and grease-free cleaned version	E10	6.0 m (19.69 ft)	N47
Oil- and grease-free cleaned and packed ver-	L10	7.0 m (22.97 ft)	N48
sion, only for oxygen application, only inert fill		8.0 m (26.25 ft) 9.0 m (29.53 ft)	N49 N50
fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in		9.0 m (29.53 it) 10.0 m (32.81 ft)	N51
connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2		only for 7MF4983	
One-sided mounting on differential pressure		11.0 m (36.09 ft)	N52
transmitters (only for 7MF4980)		12.0 m (39.37 ft) 13.0 m (42.65 ft)	N53 N54
on high-pressure side	H10	14.0 m (45.93 ft)	N55
on low-pressure side	H11	15.0 m (49.21 ft)	N56

Remote seals for transmitters and pressure gauges

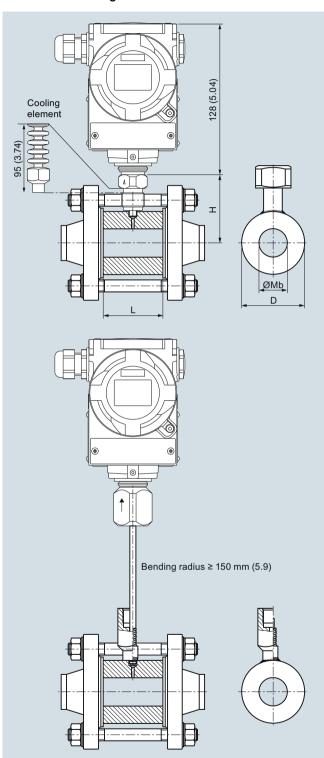
Inline seals for flange-mounting

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code.	
PVC protective tube	
over the spiral protective tube of the capillaries (color: black)	
1.0 m (3.28 ft)	N60
1.6 m (5.25 ft)	N61
2.0 m (6.56 ft)	N62
2.5 m (8.20 ft)	N63
3.0 m (9.84 ft)	N64
4.0 m (13.12 ft)	N65
5.0 m (16.40 ft)	N66
6.0 m (19.69 ft) 7.0 m (22.97 ft)	N67 N68
, ,	
8.0 m (26.25 ft) 9.0 m (29.53 ft)	N69 N70
10.0 m (32.81 ft)	N71
only for 7MF4983	
11.0 m (36.09 ft)	N72
12.0 m (39.37 ft)	N73
13.0 m (42.65 ft)	N74
14.0 m (45.93 ft)	N75
15.0 m (49.21 ft)	N76
Cooling element	R22
max. medium temperature 300 °C, observe the maximum permissible media temperature of the	
filling liquid.	
<b>Negative pressure service</b> for use in low-pressure range for transmitters for	
• gauge and absolute pressure from the pres-	V01
sure series	•••
differential pressure	V03
Note: Suffix "Y01" required with pressure transmitter	
Extended negative pressure service	
for use in low-pressure range for transmitters for	V=4
<ul> <li>gauge and absolute pressure from the pressure series</li> </ul>	V51
differential pressure	V53
Note:	
Suffix "Y01" required with pressure transmitter	

Remote seals for transmitters and pressure gauges

### Inline seals for flange-mounting

### Dimensional drawings



Inline seal for flange-mounting, connected to SITRANS P pressure transmitter, dimensions in mm (inch)  $\,$ 

### Connection to EN 1092-1

DN	PN	D	Mb	L	Н
mm	bar	mm	mm	mm	mm
25	6 100	63	28.5	60	78.5
40	6 100	85	43	60	89.5
50	6 100	95	54.5	60	92.5
80	6 100	130	82.5	60	112
100	6 100	150	107	60	122

### Connection to ASME B16.5

DN	Class	D	Mb	L	Н
(inch)		mm	mm	mm	mm
		(inch)	(inch)	(inch)	(inch)
1	150 2500	63	28.5	60	78.5
		(2.48)	(1.12)	(2.36)	(3.1)
11/2	150 2500	85	43	60	86
		(3.35)	(1.69)	(2.36)	(3.4)
2	150 2500	95	54.5	60	94.5
		(3.74)	(2.15)	(2.36)	(3.72)
3	150 2500	130	82.5	60	112
		(5.12)	(3.25)	(2.36)	(4.4)
4	150 2500	150	107	60	122
		(5.9)	(4.21)	(2.36)	(4.8)

### Remote seals for transmitters and pressure gauges

Quick-release inline seals

### Overview



Quick-release inline seals, to DIN 11851 with threaded socket



Quick-release inline seals, with clamp connection

Quick-release inline seals for pressure are available for the following SITRANS P pressure transmitter series:

- P300
- DS III with HART
- DS III with PROFIBUS PA
- DS III with FOUNDATION Fieldbus

### Application

The quick-release inline seal is a special design for flowing media and high-viscosity media. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. The measured medium flows unhindered through the inline seal and results in self-cleaning of the measuring chamber. Furthermore, the inline seal can be cleaned by a pig.

### Design

The guick-release clamp is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The inline seal is connected to the pressure transmitter either directly or by way of a capillary.

### Function

The measured pressure is transferred from the diaphragm. mounted on the inner circumference of the inline seal, to the filling liquid and then passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the inline seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

### Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof pressure transmitter (see Selection and Ordering data).

### Technical specifications

Inline seals of quick-release desi	gn for pressure		
Connection	Nominal diameter	Nominal pressure	
• To DIN 11851 with threaded	DN 25	PN 40	
socket	DN 40	PN 40	
	DN 50	PN 25	
	DN 65	PN 25	
	DN 80	PN 25	
	DN 100	PN 25	
<ul> <li>Clamp connection</li> </ul>	1½ inch	PN 40	
	2 inch	PN 40	
	2½ inch	PN 40	
	3 inch	PN 40	
Material			
Main body	Stainless steel 1.	4404/316L	
• Diaphragm	Stainless steel 1.	4404/316L	
Capillary			
• Length	Max. 10 m (32.8	ft)	
<ul> <li>Internal diameter</li> </ul>	2 mm (0.079 inch	٦)	
<ul> <li>Minimum bending radius</li> </ul>	150 mm (5.9 inch	٦)	
• Sheath	Spiral protective stainless steel, m 1.4301/316		
Filling liquid	• Food oil (FDA li	isted)	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals		
Weight	Approx. 4 kg (ap	prox. 8.82 lb)	
Certificate and approvals			
Classification according to pressure equipment directive (DRGI 97/23/FC)		d group 1 and liq- p 1; complies with	

(DRGL 97/23/EC)

the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

**EHEDG** 

Complies with EHEDG recommendations

Remote seals for transmitters and pressure gauges

### Quick-release inline seals

Selection and Orderin	ng data	Article	No.	Ord	. co	de
Quick-release inline s	7 M F 4	1950	) -			
for SITRANS P pressure transmitters for pressure 7MF403 and 7MF423 together with Order code "V01" (Negative pressure service) and 7MF802); must be ordered separately Filling liquid: Food oil (FDA listed) Material: Stainless steel 316L				В	1	
Click on the Article ration in the PIA Life	No. for the online configue Cycle Portal.					
Nominal diameter  Connection to DIN 11  DN 25  DN 40  DN 50  DN 65  DN 80  DN 100  Clamp connection  1½ inch  2 inch  3 inch  Other version  Add Order codes and Process connection: Nominal pressure:	PN 40 PN 40 PN 25 PN 25 PN 25 PN 25 PN 16 PN 16 PN 16 PN 10	2 B 2 D 2 E 2 F 2 G 2 H 4 L 4 M 4 N 4 P			Н1	Y
Filling liquid • Food oil (FDA listed) Other version Add Order code and p Filling liquid:	olain text:		7 9		M 1	Y
Connection to transm	nitter	_				
<ul> <li>Direct</li> <li>Through capillary, leng</li> <li>1.0 m (3.28 ft)</li> <li>1.6 m (5.25 ft)</li> <li>2.5 m (8.20 ft)</li> <li>4.0 m (13.1 ft)</li> <li>6.0 m (19.7 ft)</li> <li>8.0 m (26.25 ft)</li> <li>10.0 m (32.8 ft)</li> </ul>	yth: <sup>2)</sup>		2 3 4 5 6 7			
Special lengths for ca	apillaries					
• 2.0 m (6.56 ft) • 3.0 m (9.84 ft) • 5.0 m (16.40 ft) • 7.0 m (23.97 ft) • 9.0 m (29.53 ft)			9 9 9		N 1 N 1 N 1 N 1 N 1	E G J

With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
 Max. capillary length, see section "Technical description"

Selection and Ordering data	Order code
Further designs	01401 0040
Please add "-Z" to Article No. and specify Order code.	
Remote seal nameplate	B20
Attached out of stainless steel, contains MLFB and order number of the remote seal	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11
Inspection certificate to EN 10204, section 3.1	C12
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	C17
Functional safety certificate ("SIL 2") to IEC 61508	C20
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	
Functional safety certificate ("SIL 2/3") to IEC 61508	C23
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	
One-sided mounting on differential pressure transmitters	
on high-pressure side	H10
on low-pressure side	H11
<b>PE protective tube</b> over the spiral protective tube of the capillaries (color: white)	
1.0 m (3.28 ft)	N20
1.6 m (5.25 ft) 2.0 m (6.56 ft)	N21 N22
2.5 m (8.20 ft)	N23
3.0 m (9.84 ft) 4.0 m (13.12 ft)	N24 N25
5.0 m (16.40 ft)	N26
6.0 m (19.69 ft)	N27
7.0 m (22.97 ft)	N28
8.0 m (26.25 ft) 9.0 m (29.53 ft)	N29 N30
10.0 m (32.81 ft)	N31
<b>PTFE protective tube</b> over the spiral protective tube of the capillaries	
(color: transparent)	
1.0 m (3.28 ft) 1.6 m (5.25 ft)	N40 N41
2.0 m (6.56 ft)	N42
2.5 m (8.20 ft)	N43
3.0 m (9.84 ft) 4.0 m (13.12 ft)	N44 N45
5.0 m (16.40 ft)	N46
6.0 m (19.69 ft) 7.0 m (22.97 ft)	N47 N48
8.0 m (26.25 ft)	N49
9.0 m (29.53 ft) 10.0 m (32.81 ft)	N50 N51

Remote seals for transmitters and pressure gauges

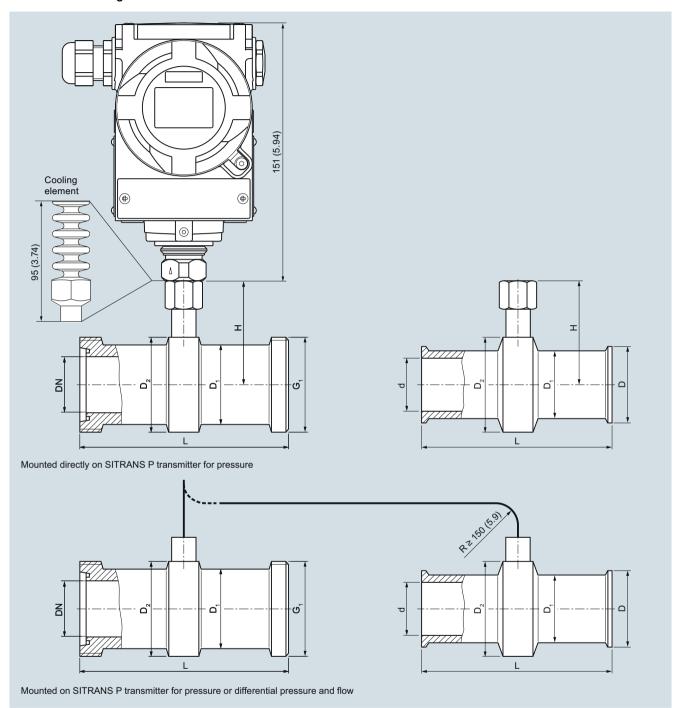
Quick-release inline seals

Selecti	on and Ordering data	Order code
Furthe	r designs	
Please code.	add "-Z" to Article No. and specify Order	
•	otective tube e spiral protective tube of the capillaries black)	
2.0 m 2.5 m	(3.28 ft) (5.25 ft) (6.56 ft) (8.20 ft) (9.84 ft)	N60 N61 N62 N63 N64
7.0 m	(13.12 ft) (16.40 ft) (19.69 ft) (22.97 ft)	N65 N66 N67 N68
8.0 m 9.0 m 10.0 m	(26.25 ft) (29.53 ft) (32.81 ft)	N69 N70 N71
max. m	g element edium temperature 300 °C, observe the um permissible media temperature of the quid.	R22
for use	re pressure services in low-pressure range for transmitters for e and absolute pressure from the pres- eries	V01
for use	ed negative pressure service in low-pressure range for transmitters for e and absolute pressure from the pres- series	V51

Remote seals for transmitters and pressure gauges

Quick-release inline seals

### Dimensional drawings



Connection to DIN 11851 with screw necks								
DN	$ØD_1$	$Ø$ $D_2$	Н	L	G <sub>1</sub>			
25	38	52	68	128	Rd 52x1/6			
40	55	65	74.5	160	Rd 65x1/6			
50	68	78	81	170	Rd 78x1/6			
65	85	95	89.5	182	Rd 95x1/6			
80	110	110	97	182	Rd 110x1/4			
100	130	130	107	182	Rd 110x1/4			

Quick-release inline seal,	dimensions	in mm	(inch)
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Clam	Clamp connection for pipes to BS 4825/3 and o.D. tubes										
d		$ oldsymbol{\emptyset} D_1 oldsymbol{$		$Ø$ $D_2$		Н		L		D	
mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
22.2	(1)	38	(1.5)	50	(1.97)	67	(2.64)	114	(4.49)	50.5	(1.98)
34.9	(1½)	43	(1.69)	65	(2.56)	74.5	(2.93)	146	(5.75)	50.5	(1.98)
47.6	(2)	56	(2.2)	75	(2.95)	79.5	(3.13)	156	(6.14)	64	(2.52)
60.3	(2½)	68	(2.68)	77	(3.03)	80.5	(3.17)	156	(6.14)	77.5	(3.05)
73.0	(3)	82	(3.23)	91	(3.58)	87.5	(3.44)	156	(6.14)	91	(3.58)

Remote seals for transmitters and pressure gauges

### **Measuring setups**

### Overview

This section shows examples of typical measuring setups for using SITRANS P pressure transmitters with and without remote seals.

Equations for calculating start of scale and full scale are provided for each example.

Questionnaires are included to help you select the right combination of remote seal and pressure transmitter.

### Installation

Remote seals of sandwich design are fitted between the connection flange of the measuring point and a dummy flange. Remote seals of flange design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the dummy flange or the flanged remote seal must be observed.

The pressure transmitter should be installed below the connection flange (and below the lower connection flange in the case of differential pressure transmitters). This arrangement <u>must</u> be used in the low-pressure range.

When measuring at pressures above atmospheric, the pressure transmitter can also be installed above the connection flange.

The capillaries between the remote seal and the pressure transmitter should be as short as possible to obtain a good transmission response.

### Offset of measuring range

If there is a difference in height between the two connection flanges when measuring with two remote seals, an additional differential pressure will result from the oil filling of the remote seal capillaries. This results in a measuring range offset which has to be taken into account when you set the pressure transmitter.

An offset in the measuring range also occurs when combining a remote seal with a transmitter if the remote seal is not installed at the same height as the transmitter.

### Pressure transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and hence the output signal of the pressure transmitter also increase.

For an inverted relationship between the differential pressure and the output signal, the start-of-scale and full-scale values of the SITRANS P must be interchanged.

With open vessels, a rising pressure is usually assigned to an increasing level, separation layer or density.

### Influence of ambient temperature

Temperature differences between the individual capillaries and between the individual remote seals should be avoided.

Temperature variations in the area of the measuring setup cause a change in volume of the filling liquid and hence measuring errors.

### Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

### Possible combinations of pressure transmitters and remote seals

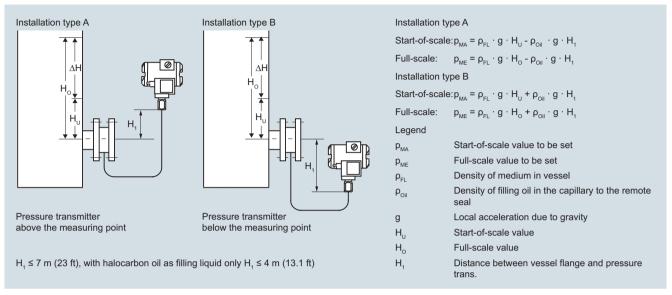
Type of installation	Pressure trans- mitters	Remote seals
A/B	7MF4033 7MF4034 7MF4035 7MF8023 7MF8024 7MF8025	7MF4900 7MF4910 7MF4920
C <sub>1</sub> and C <sub>2</sub>	7MF4233 7MF4234 7MF4235	7MF4900 7MF4910 7MF4920 (negative pressure service in each case)
	7MF4333 7MF4334 7MF4335	7MF4901 7MF4921
D	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4903 7MF4923
E	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4913
G, H and J	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4903 7MF4923

Remote seals for transmitters and pressure gauges

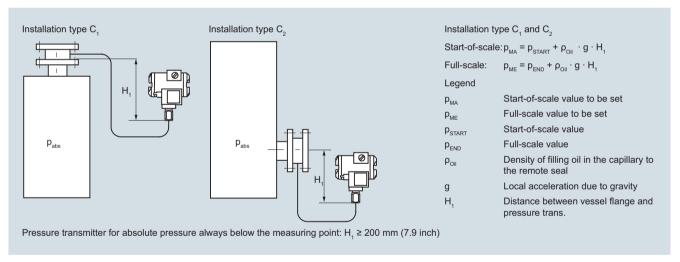
### Measuring setups with remote seals

### Dimensional drawings

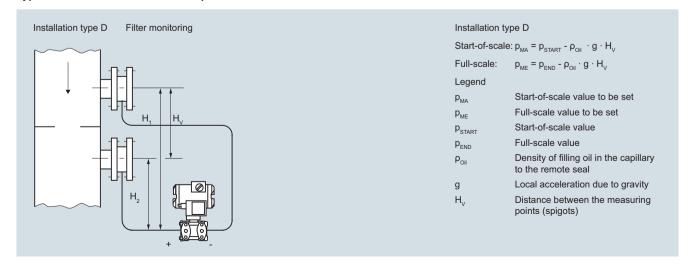
### Types of installation for pressure and level measurements (open vessels)



### Types of installation for absolute level measurements (closed vessels)



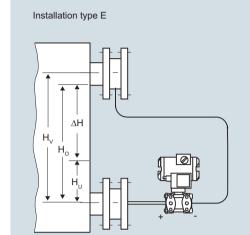
### Type of installation for differential pressure and flow measurements



### Remote seals for transmitters and pressure gauges

### Measuring setups with remote seals

### Types of installation for level measurements (closed vessels)



Installation type E

Start-of-scale:  $p_{MA} = \rho_{FL} \cdot g \cdot H_{U} - \rho_{Oil} \cdot g \cdot H_{V}$ Full-scale:  $\boldsymbol{p}_{\text{ME}} = \boldsymbol{\rho}_{\text{FL}} \cdot \boldsymbol{g} \cdot \boldsymbol{H}_{\text{O}} - \boldsymbol{\rho}_{\text{Oil}} \cdot \boldsymbol{g} \cdot \boldsymbol{H}_{\text{V}}$ 

Legend

Start-of-scale value to be set  $p_{MA}$  $\boldsymbol{p}_{\text{ME}}$ Full-scale value to be set Density of medium in vessel  $\rho_{\text{FL}}$ Density of filling oil in the capillary to  $\rho_{\text{Oil}}$ 

the remote seal

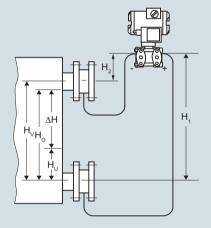
Local acceleration due to gravity g

 $H_{U}$ Start-of-scale value Full-scale value  $H_{\circ}$ 

 $H_{v}$ Distance between the measuring

points (spigots)

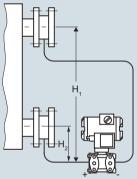




Pressure transmitter for differential pressure above the upper measuring point, no vacuum

 $H_1 \le 7$  m (23 ft), with halocarbon oil as filling liquid only  $H_1 \le 4 \text{ m}$  (13.1 ft)

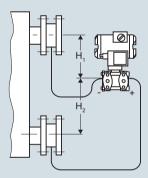
Installation type H



below the lower measuring point

Installation type for vacuum applications

Installation type J



between the measuring points, no vacuum

 $H_2 \le 7$  m (23 ft), with halocarbon oil as filling liquid only  $H_2 \le 4 \text{ m} (13.1 \text{ ft})$ 

Installation type G, H and J

Start-of-scale:  $p_{MA} = \rho_{FL} \cdot g \cdot H_{U} - \rho_{Oil} \cdot g \cdot H_{V}$ 

Full-scale:  $p_{ME} = \rho_{FL} \cdot g \cdot H_{O} - \rho_{Oil} \cdot g \cdot H_{V}$ 

Legend

Start-of-scale value to be set  $\boldsymbol{p}_{\text{MA}}$ Full-scale value to be set Density of medium in vessel Density of filling oil in the capillary to  $\rho_{\text{Oil}}$ 

the remote seal

Local acceleration due to gravity g

 $H_{U}$ Start-of-scale value  $H_{\rm o}$ Full-scale value

Distance between the measuring  $H_{v}$ points (spigots)

Remote seals for transmitters and pressure gauges

### Measuring setups without remote seals

### Overview

### Notes

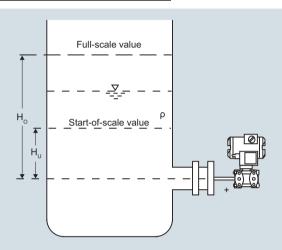
 For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.

• When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot

### Dimensional drawings

### Pressure transmitters for differential pressure, for flanging

Measuring setups for open containers



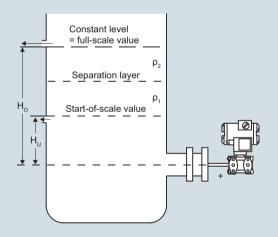
### Level measurement

Start-of-scale:  $p_{MA} = \rho \cdot g \cdot H_{U}$ Full-scale:  $p_{ME} = \rho \cdot g \cdot H_{O}$ 

Legend

 $\begin{array}{ll} p_{\text{MA}} & \text{Start-of-scale value to be set} \\ p_{\text{ME}} & \text{Full-scale value to be set} \\ \rho & \text{Density of medium in vessel} \\ g & \text{Local acceleration due to gravity} \end{array}$ 

 $H_{\cup}$  Start-of-scale value  $H_{\cap}$  Full-scale value



### Separation layer measurement

Start-of-scale:  $p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$ 

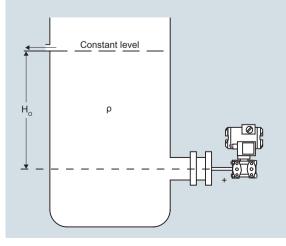
Full-scale:  $p_{ME} = p_1 \cdot g \cdot H_0$ 

Legend

 $\begin{array}{ll} {\rm p_{\rm MA}} & {\rm Start}\text{-of-scale value to be set} \\ {\rm p_{\rm ME}} & {\rm Full\text{-scale value to be set}} \\ {\rm \rho_1} & {\rm Density~of~heavier~liquid} \\ {\rm \rho_2} & {\rm Density~of~lighter~liquid} \\ {\rm g} & {\rm Local~acceleration~due~to~gravity} \end{array}$ 

H<sub>U</sub> Start-of-scale value

H<sub>o</sub> Full-scale value



### Density measurement

Start-of-scale:  $p_{MA} = p_{MIN} \cdot g \cdot H_{O}$ 

Full-scale:  $p_{ME} = \rho_{MAX} \cdot g \cdot H_{O}$ 

Legende

 $\begin{array}{ll} {\rm p_{MA}} & {\rm Start\text{-}of\text{-}scale} \; {\rm value} \; {\rm to} \; {\rm be} \; {\rm set} \\ \\ {\rm p_{ME}} & {\rm Full\text{-}scale} \; {\rm value} \; {\rm to} \; {\rm be} \; {\rm set} \end{array}$ 

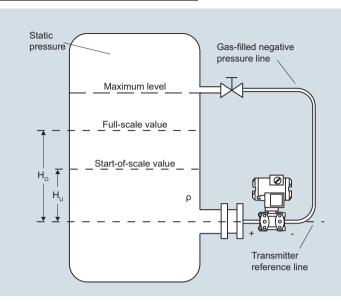
 $\begin{array}{ll} \rho_{\text{MIN}} & \text{Minimum density of medium in vessel} \\ \rho_{\text{MAX}} & \text{Maximum density of medium in vessel} \\ g & \text{Local acceleration due to gravity} \end{array}$ 

H<sub>o</sub> Full-scale value in m

### Remote seals for transmitters and pressure gauges

### Measuring setups without remote seals

### Measuring setups for closed containers

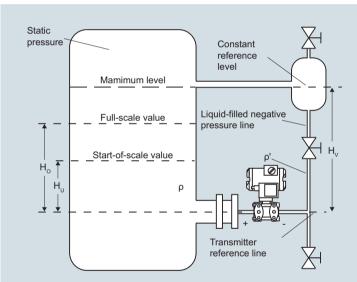


Level measurement, Version 1 Start-of-scale:  $\Delta p_{MA} = \rho \cdot g \cdot H_{U}$  $\Delta pME = \rho \cdot g \cdot H_o$ 

Full-scale: Legend

Start-of-scale value to be set  $\Delta p_{MA}$  $\Delta p_{MF}$ Full-scale value to be set ρ Density of medium in vessel Local acceleration due to gravity g

Start-of-scale value  $H_{ij}$ Но Full-scale value



Level measurement, Version 2

Start-of-scale:  $\Delta p_{MA} = g \cdot (H_{U} \cdot \rho - H_{V} \cdot \rho')$ Full-scale:  $\Delta p_{ME} = g \cdot (H_{O} \cdot \rho - H_{V} \cdot \rho')$ 

Legend

ρ

Start-of-scale value to be set  $\Delta p_{MA}$ Full-scale value to be set  $\Delta p_{ME}$ Density of medium in vessel

Density of liquid in the negative pressure ρ' line (corresponding to the temperature

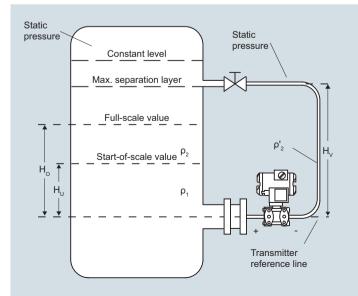
existing there)

Local acceleration due to gravity g

 $H_{U}$ Start-of-scale value  $H_{\circ}$ Full-scale value

 $H_{v}$ Distance between the measuring points

(spigots)



Separation layer measurement

Start-of-scale:  $\Delta p_{MA} = g \cdot (H_{U} \cdot \rho_{1} + (H_{O} - H_{U}) \cdot \rho_{2} - H_{V} \cdot \rho_{2}')$ 

Full-scale:  $\Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho_2)$ 

Legend

 $\Delta p_{MA}$ Start-of-scale value to be set Full-scale value to be set  $\Delta p_{_{ME}}$ 

Density of heavier liquid with separation layer ρ

Density of lighter liquid with separation layer  $\rho_{\scriptscriptstyle 2}$ Density of liquid in the negative pressure line  $\rho'_2$ (corresponding to the temperature existing

there)

Local acceleration due to gravity g

Start-of-scale value  $H_{ii}$  $H_{\circ}$ Full-scale value

 $H_{v}$ Distance between the measuring points

(spigots)

### **SIEMENS**

### Questionnaire

### Checking of transmitter/remote seal combinations

	* Plant: * Ordering code: * Ordering department:	Tag. No.: Item No.: Person responsible: Phone: IS P DSIII/P300/P310/P410: 7MF	
	* Transmitter Article No. SITRA		
	Yes	ticle No. of diaphragm seal known?	No
<b>7MF 4 9</b> Su	lo. of remote seal:	* Or without Article No.: Print * Standard:     * Nominal diameter:     * Nominal pressure:     * Constructional design:	Sandwich-type rem. seal Flanged remote seal Quick-release
		* Connection:	remote seal  Clamp-on seal Other.: Direct connection Capillary on one side; connection to: + side Capillaries on both sides;
		* Vacuum-proof design * Wetted parts materials: * Tube: * Filling liquid * Miscellaneous	Capillaries on both sides,  Capillary length: m  Yes No  No Yes,mm long
	Calculat	ion of measuring range necessary?	S
Full-scale	lculation) scale: mbar ( 4 mA) e: mbar (20 mA) measuring accuracy:	Medium Density of medium: * Temperature of medium:  * Ambient temperature on capillaries:	kg/m <sup>3</sup> Normal °C  Minimum °C  Maximum °C  Normal °C  Minimum °C  Maximum_ °C
Please fill	in this questionnaire	* Ambient temperature on transmitter:  * Operating pressure referred to absolute zero  * Does a vacuum occur during startup?  If yes, associated temperature of medium:	Normal °C Minimum °C Maximum °C  : bar a   □ No □ Yes   °C
and enclo	must be entered here!	* Installation type, see pages 1/328 and 1/329  * Measuring: With install, types A, B, C <sub>1</sub> , C <sub>2</sub> and	A B C₁ C₂ D E G H J ad D: from to mbar
		<ul> <li>range With install. types A, B, G, H and</li> <li>* Dimensions: With install. types A, B, C<sub>1</sub> and C With install. types D, G, H and J:</li> <li>* Start-of-scale value following calculation:</li> </ul>	2: H <sub>1</sub> = mm H <sub>V</sub> = mm
Checked:	Name: Department: Date:	Full-scale value following calculation: mb.  Associated span: mb.  Error to be expected: < . % of s	mbar (20 mA)

### **SIEMENS**

## Questionnaire for hydrostatic level measurements

# Order date: Processing date: Ordering code (customer): Customer reference: Measuring point: Position: Dimensions: Pressure: | bar Temperature: | K | °C

The different pressures and temperatures (densities) in the vessel and in the reference column result in an offset in the start-of-scale

7,M,F,5, , , ,\_,

Article No. of transmitter SITRANS P500<sup>1</sup>):

Measuring range: (please mark with cross)

cm

m

The calibration data are determined in addition.

and full-scale values.

It is also checked whether – as a result of the range offset – the ordered transmitter is suitable for this measurement.

Please supply the following characteristic data so that we can calculate the measuring range, start-of-scale value, full-scale value and calibration data:

Please mark type of boiler with a cross:	Closed <sup>1)</sup>		
	Open or not under pres	sure <sup>2)</sup>	
Medium			
Licensed boiler pressure (absolute)			_ bar
Operating pressure (absolute)	Lowest		_ bar
	Normal <sup>3)</sup>		_ bar
	Highest		_ bar
Temperature of reference column (cold)			_ K
Distance between measuring points (dir	nension according to ske	tch) H <sub>V</sub> =	_ m
Measuring range <sup>4)</sup> = start-of-scale value	e to full-scale value		
	Start-of-scale value	H <sub>U</sub> =	_ m
	Full-scale value	H <sub>O</sub> =	_ m
Position of equalizing vessel above botto point if different from ${\rm H}_{\rm V}$	om measuring		_ m
Please mark pressure correction of level	with a cross: No		

1) Reference line filled with condensation! Falling differential pressure with increasing level.

2) Reference line without gas or filled with gas (air). Rising differential pressure with increasing level.

3) If not specified otherwise, this value is assumed as the calculation pressure of the level meter. The input signal (differential pressure) depends on the density (pressure and temperature). The influence is practically negligible for a lowest liquid level of 20 to 30% of the distance between the measuring points.

4) If a pressure correction of the level is required, the measuring range must be the same as the distance between the measuring points, and the transmitter is designed for the calculation pressure of 1 bar (absolute). Pressure correction means: the static pressure and the temperature are measured separately and calculated by a correction computer or measured-value computer.

### **SIEMENS**

# Questionnaire (suitable for US market) Checking of transmitter/remote seal combinations

	* Customer:	Tag. No.:	
	* Plant:	=	
	* Ordering code:		
	* Ordering department:	Phone:	
	* Transmitter Article No. SITRAN	S P DS III/P300/P310/P410: 7MF 🗌 🗌 🔲 –1 🗌 Y	
	* Transmitter Article No. SITRAN	S P500: 7MF5 0 -Z V00	
	Yes	ticle No. of diaphragm seal known?	
7MF 4	No. of remote seal:  9	* Or without Article No.: Pro  * Standard:  * Nominal diameter:  * Nominal pressure:  * Constructional design:  * Connection:   * Vacuum-proof design  * Wetted parts materials:  * Tube:  * Filling liquid  * Miscellaneous  ion of measuring range necessary?	Cess connection  Sandwich-type rem. seal Flanged remote seal Quick-release remote seal Clamp-on seal Other.: Direct connection Capillary on one side; connection to: + side - side Capillaries on both sides; Capillary length: ft Yes No  No Yes, _inch long
	No	Yes	
Start-o	be set: calculation) f-scale: psi ( 4 mA) ale: psi (20 mA) I measuring accuracy:	Medium Density of medium: * Temperature of medium:  * Ambient temperature on capillaries:  * Ambient temperature on transmitter:	kg/m <sup>3</sup> Normal
and enc	ill in this questionnaire lose with every order! s must be entered here!  Name: Department: Date:	Associated span:  Error to be expected: < . % of set	$H_{U} = $ inch; $H_{O} = $ inch $H_{1} = $ inch $H_{V} = $ inch psi ( 4 mA) psi (20 mA) psi

Fittings

**Technical description** 

### Overview

All shut-off fittings can be secured onto walls, racks (72 mm grid) and vertical and horizontal pipes.

This offers the advantage when assembling a plant that the shutoff fittings can be secured first and the lines for the medium and differential pressure connected to them. It is then possible to check all connections for leaks and to blow out or flush the pipes in order to remove dirt (welding residues, shavings etc.).

The measuring instruments can be screwed onto the shut-off fittings right at the end when all piping has been completed.

If an instrument has to be removed for maintenance, the fittings and pipes remain as they are. It is only necessary to close the valves – the instrument can then be removed, and refitted following maintenance.

### Classification according to pressure equipment directive (PED 97/23/EC):

For gases of fluid group 1 and liquids of fluid group 1; compliance with requirements of article 3, paragraph 3 (sound engineering practice).

### New standard IEC 61518

The flange connection between transmitter and valve manifold was modified in the new standard IEC 61518. The only connection thread approved for use in the process flanges of the pressure transmitter is  $^7/_{16}$ -20 UNF.

The valve manifolds for M12 screws, including the accessory sets, have therefore been deleted.

### Material acceptance test certificate to EN 10204-3.1

If a material acceptance test certificate to EN 10204-3.1 is required when ordering valve manifolds or shut-off fittings, please note that a single certificate is sufficient for each ordered item type. This means that you will only be charged for one certificate in the cost calculations.

### Pressure transmitters with shut-off fittings - mounting examples



SITRANS P transmitter for gauge pressure with double shut-off valve, SITRANS P pressure transmitter with multiway cock or 3-spindle valve manifold



SITRANS P pressure transmitter for differential pressure, mounted in protective box (available on request)



SITRANS P transmitter for differential pressure with 3-way valve manifold, 3-spindle valve manifold or valve manifold combination DN 5/DN 8



SITRANS P pressure transmitter mounted on valve combination "Mono-flange" for direct connection to flanges (available on request)

Fittings

### Selection aid

### Selection of available shut-off valves

Transmitters	Shut-off valves for general applications	Page		Shut-off valves for special applications	Page	
Relative and absolute pressure transmitters with process connection G½" male thread e.g.  • SITRANS P200 7MF1565 • SITRANS P210	Shut-off valves/double shut- off valves to DIN 16270, DIN 16271 and DIN 16272	1/338		Double shut-off valve DN 5 for crossover ½-NPT-F to G½ nipple connection 7MF9011-4EA	1/341	
7MF1566  • SITRANS P220 7MF1567  • SITRANS P300 7MF8020  • SITRANS P DS III series 7MF4030 and 7MF4230				2-spindle valve manifold DN 5 for installation in pro- tective boxes 7MF9412-1B	1/359	
Relative and absolute pressure transmitter with 1/2"-14 NPT female thread e.g.  • SITRANS P200 7MF1565  • SITRANS P210 7MF1566  • SITRANS P220 7MF1567  • SITRANS P300 7MF8021  • SITRANS P DS III series 7MF4031 and 7MF4231	Double shut-off valve DN 5 7MF9011-4EA, -4FA, -4GA and -4KA	1/341	7MF9011-4FA 7MF9011-4KA	Double shut-off valve DN 5 for process connection ½-NPT 7MF9011-4HA	1/341	
Absolute pressure transmitter with process connection to IEC 61518 e.g. • SITRANS P DS III series 7MF433	2-spindle valve manifold DN 5 7MF9411-5A.	1/344	him of the	2-spindle valve manifold DN 5 for installation in pro- tective boxes 7MF9412-1C.	1/359	

Fittings

### Selection aid

						Selection aid
Transmitters	Shut-off valves for general applications	Page		Shut-off valves for special applications	Page	
Differential pressure transmitter with process connection to IEC 61518 e.g. SITRANS P DS III series 7MF443 and 7MF453	For 3/5-spindle valve manifold DN 5 7MF9411-5B. and 7MF9411-5C.	1/344	14.50	3-way valve manifolds, DN 5, forged version 7MF9410-1	1/349	33.5
SITRANS P500 7MF54			Jan 1	5-way valve manifolds, DN 5, forged version 7MF9410-3	1/349	
	PN 100 multiway cocks 7MF9004	1/347		3-way valve manifolds, DN 8, forged version 7MF9416-1 and 7MF9416-2	1/352	
				Valve manifold combination DN 5/DN 8 for vapor measurement 7MF9416-6	1/355	
				Valve manifold combination DN 8 for vapor measurement 7MF9416-4	1/357	
				3- and 5-spindle valve manifolds for DN 5 for installation in protective boxes 7MF9412-1D. and 7MF9412-1E.	1/359	
						A. G.
					3- and 5-spindle valve manifolds for vertical dif- ferential pressure lines 7MF9413-1	1/363
				Low-pressure multiway cock 7MF9004-4	1/366	

Fittlings - Shut-off valves for gauge and absolute pressure transmitters

### Shut-off valves to DIN 16270, DIN 16271 and DIN 16272

### Overview



Transmitter for pressure with double shut-off valve 7MF9401-...

The shut-off valves for pressure gauges are used to shut off the line of the measured medium when dealing with aggressive and non-aggressive gases, vapors and liquids.

### Design

A water trap must be connected upstream of the shut-off valve in the case of temperatures of the medium above 120 °C. The shut-off valves form B have a shaft with which they can be secured on an instrument bracket. An adapter is therefore not required to secure these valves. The vent/test connection can be shut off separately with the double shut-off valves DN 5. This permits checking of the zero on the pressure gauge. In addition, the characteristic of the pressure gauge can be checked using an external pressure source.

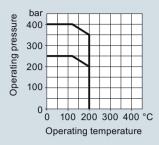
Selection and Orderi	ng data	Article No.	
Shut-off valves, form	Shut-off valves, form B, DIN 16270		
without test collar, cor without certificate	nection shank,		
Material Valve housing	Maximum permissible working pressure		
CW614N (CuZn39Pb3 (mat. No. 2.0402)	3)250 bar (3626 psi)	7MF9401-7AA	
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-7AB	
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T		7MF9401-7AC	
Shut-off valves, form	B, DIN 16271		
with test collar, conne- without certificate	ction shank,		
Material Valve housing	Maximum permissible working pressure		
CW614N (CuZn39Pb3 (mat. No. 2.0402)	3)250 bar (3626 psi)	7MF9401-7BA	
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-7BB	
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T		7MF9401-7BC	

Selection and Orderi	ng data	Article No.
Shut-off valves, form	B, DIN 16270	
without test collar, pip 12 S DIN EN ISO 8434		
Material Valve housing	Maximum permissible working pressure	
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-8AB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T		7MF9401-8AC
Shut-off valves, form	B, DIN 16271	
with test collar, pipe u 12 S DIN EN ISO 8434		
Material Valve housing	Maximum permissible working pressure	
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-8BB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T		7MF9401-8BC
Double shut-off valve	es, form B, DIN 16272	
with test collar, connectivity without certificate	ction shank,	
Material Valve housing	Maximum permissible working pressure	
CW614N (CuZn39Pb3 (mat. No. 2.0402)	3)250 bar (3626 psi)	7MF9401-7DA
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-7DB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T	400 bar (5800 psi) i)	7MF9401-7DC
Double shut-off valve	es, form B, DIN 16272	
with test collar, pipe u 12 S DIN EN ISO 8434		
Material Valve housing	Maximum permissible working pressure	
P250GH (mat. No. 1.0460)	400 bar (5800 psi)	7MF9401-8DB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316T	7MF9401-8DC	
Accessories		
Factory test certificate	EN 10204-2.2	7MF9000-8AB
Material acceptance t EN 10204-3.1	7MF9000-8AD	

Fittlings - Shut-off valves for gauge and absolute pressure transmitters

Shut-off valves to DIN 16270, DIN 16271 and DIN 16272

### Characteristic curves

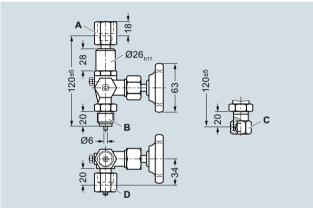


Steel or stainless steel version 400 bar (5800 psi) at 120 °C (248 °F) 350 bar (5076 psi) at 200 °C (392 °F)

Brass version 250 bar (3626 psi) at 120 °C (248 °F) 200 bar (2901 psi) at 200 °C (392 °F)

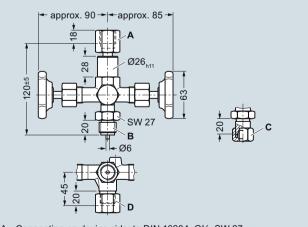
Permissible operating pressure as a function of the permissible operating temperature

### Dimensional drawings



- A Connection on device side: to DIN 16284, G1/2, SW 27
- B Connection on measurement side: connection shank to DIN EN 837-1,  $G\frac{1}{2}$
- C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
- D Connection on test collar (with sealing cap): thread M20 x 1,5

Shut-off valve, form B, dimension drawing, dimensions in mm



- A Connection on device side: to DIN 16284, G1/2, SW 27
- B Connection on measurement side: connection shank to DIN EN 837-1, G½
- C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
- D Connection on test collar (with sealing cap): thread M20 x 1,5

Double shut-off valve, form B, dimension drawing, dimensions in mm

Fittlings - Shut-off valves for gauge and absolute pressure transmitters

### Angle adapter

### Overview

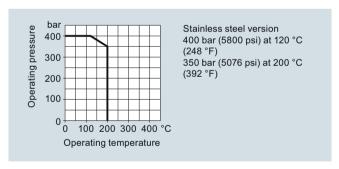


P300 pressure transmitter with shut-off valve and angle adapter

The angle adapter enables pressure transmitters with top displays to be read from the front.

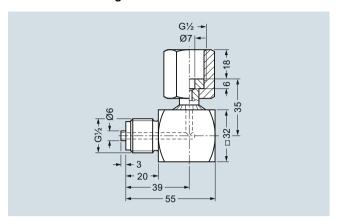
# Selection and Ordering data Article No. Angle adapters Material: X 12 CrNiMoTi 17 12 2 (mat. No. 1.45714/316Ti), max. permissible operating pressure 400 bar (5800 psi) Accessories Factory test certificate EN 10204–2.2 Material acceptance test certificate EN 10204-3.1 Article No. 7MF9401-7WA 7MF9401-7WA 7MF9000-8AB 7MF9000-8AB

### Characteristic curves



Permissible operating overpressure as a function of the permissible operating temperature

### Dimensional drawings



Angle adapter, dimensions in mm

Fittlings - Shut-off valves for gauge and absolute pressure transmitters

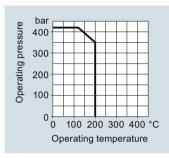
**Double shut-off valves** 

### Overview

The double shut-off valves DN 5 are suitable for pressure gauges and pressure transmitters and available in 5 versions:

- Sleeve-nipple
- Sleeve-sleeve
- Sleeve-collar
- · Collar-collar
- Collar-sleeve

### Characteristic curves

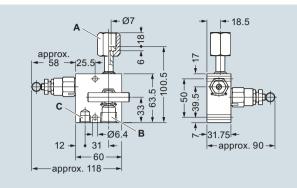


420 bar (6092 psi) at 120 °C (248 °F) 350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating pressure as a function of the permissible operating temperature

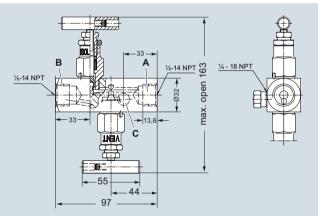
### Selection and Ordering data Article No. Double shut-off valves DN 5 Material: X 6 CrNiMoTi 17 13 2 (mat. No. 1.4404/316L), max. permissible working pressure 420 bar (6092 psi); • Sleeve-nipple connection 7MF9011-4EA 7MF9011-4HA • Sleeve-sleeve 7MF9011-4FA • Sleeve-collar • Collar-collar 7MF9011-4GA • Collar-sleeve 7MF9011-4KA Accessories 7MF9000-8AB Factory test certificate EN 10204-2.2 Material acceptance test certificate 7MF9000-8AD EN 10204-3.1 Further designs Order code Add "-Z" to Article No. and specify Order Oil- and grease-free cleaning for oxygen **S12** applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) NACE MR-0175-certified D07 incl. acceptance test certificate 3.1 to EN 10204

### Dimensional drawings



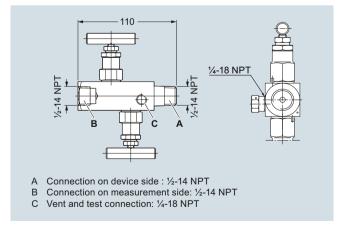
- A Connection on device side: nipple to DIN 16284, G1/2, SW 27
- B Connection on measurement side: 1/2-14 NPT
- C Vent and test connection: 1/4-18 NPT

Double shut-off valve DN 5 (sleeve-nipple) 7MF9011-4EA, dimensions in mm



- A Connection on device side: 1/2-14 NPT
- B Connection on measurement side: ½-14 NPT
- C Vent and test connection: 1/4-18 NPT

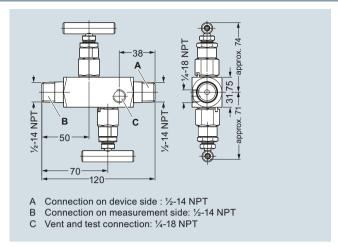
Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4HA, dimensions in mm



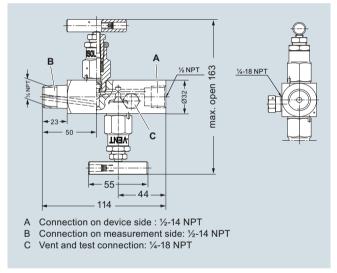
Double shut-off valve DN 5 (sleeve-collar) 7MF9011-4FA, dimensions in mm

Fittlings - Shut-off valves for gauge and absolute pressure transmitters

### **Double shut-off valves**



Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA, dimensions in mm



Double shut-off valve DN 5 (collar-sleeve) 7MF9011-4KA, dimensions in mm

### Fittlings - Shut-off valves for gauge and absolute pressure transmitters

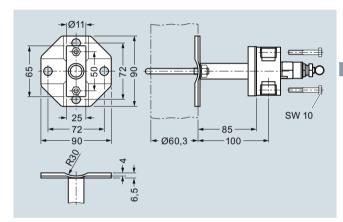
### Accessories for shut-off valves/double shut-off valves

### Overview

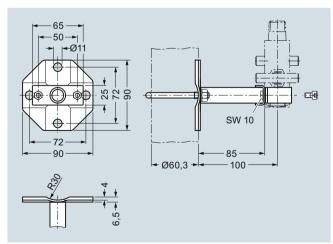
The mounting set is suitable for the double shut-off valves 7MF9011-4.A and for wall, rack and pipe mounting.

Selection and Ordering data	Article No.
Mounting set for shut-off valves	
• 7MF9011-4DA and -4EA	7MF9011-8AB
made of stainless steel, scope of delivery: 1x mounting bracket, 2x hexagon screws M6x40, 1x mounting clip, 2x washers 8.4 to DIN 125; 2x hexagon nuts 8.4 to DIN EN 24032	
• 7MF9011-4FA and -4GA	7MF9011-8AC
made of stainless steel, scope of delivery: 1x mounting bracket, 2x hexagon screws M6x10, 1x mounting clip, 2x washers 8.4 to DIN 125; 2x hexagon nuts 8.4 to DIN EN 24032	

### Dimensional drawings



Mounting bracket (7MF9011-8AB) for shut-off valves 7MF9011-4DA and 7MF9011-4EA for wall, rack or pipe mounting, dimensions in mm



Mounting bracket (7MF9011-8AC) for shut-off valves 7MF9011-4FA and 7MF9011-4GA for wall, rack or pipe mounting, dimensions in mm

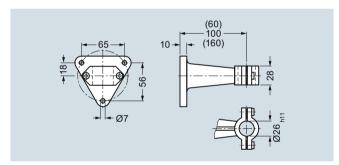
### Overview

The instrument brackets are needed to mount the following units:

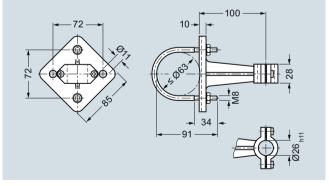
- Pressure gauges with threaded connection at the bottom
- Shut-off valves to DIN 16270, DIN 16271 and DIN 16272 (7MF9401-7.. and 7MF9401-8..)

Selection and Ordering data	Article No.
Instrument bracket, form H, DIN 16281	
(e.g. for gauge) made of aluminium alloy, painted black, for wall mounting, screw-type bracket cover • Projection length 60 mm • Projection length 100 mm	M56340-A0046 M56340-A0047
Instrument bracket, form A, DIN 16281	
(e.g. for transmitter) made of annealed cast iron, galvanized and primed for mounting on a wall or rack or or on a sectional rail (horizontal/vertical); Screw-type bracket cover	M56340-A0053
Instrument bracket, form A, DIN 16281	
(e.g. for transmitter) made of annealed cast iron, galvanized and primed with pipe clamp for wall and pipe mounting (horizotal/vertical) Screw-type bracket cover	M56340-A0079

### Dimensional drawings



Instrument bracket form H, for wall mounting, M56340-A0046/-A0047, dimensions in  $\mbox{mm}$ 



Instrument bracket form A, wall or pipe mounting, M56340-A0053/-A0079, dimensions in mm

Fittlings - Shut-off valves for differential pressure transmitters

### 2-, 3- and 5-spindle valve manifolds DN 5

### Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds 7MF9411-5.. are for pressure transmitters for absolute pressure or differential pressure.

The valve manifolds are used to shut off the differential pressure lines and to check the pressure transmitter zero.

The 2-spindle and the 5-spindle valve manifold enable in addition venting on the transmitter side and checking of the pressure transmitter characteristic.

### Benefits

- Max. working pressure 420 bar (6092 psi)
- Each available in version for oxygen

### Application

The spindle valve manifolds DN 5 are designed for liquids and gases.

Each is available in a version for oxygen on request.

### Design

All versions of the valve manifolds have a process connection ½-14 NPT. The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, form B . The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection ½-18 NPT.

The valves have an external spindle thread.

### Materials used

Component	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

### Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- · Checking the pressure transmitter characteristic

Selection and Ordering data	Article No.
Valve manifolds DN 5	7MF9411-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for liquids and gases, for flanging to pressure transmitters for absolute and differential pressure, max. working pressure 420 bar (order accessory set with Order code), without certificate	
• 2-spindle valve manifold	5 A
3-spindle valve manifold	5 B
• 5-spindle valve manifold	5 C
Accessories	
Factory test certificate EN 10204–2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN		
(connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9411-5A.		
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1¾ inch to ASME B18.2.1; chromized steel 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K35	7MF9411-7DB
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1¾ inch to ASME B18.2.1; <b>stainless steel</b> 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K45	7MF9411-7DC
for valve manifold 7MF9411-5B. and -5C.		
4x screws $^7/_{16}$ -20 UNF x $1\%$ inch to ASME B18.2.1; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K36	7MF9411-5DB
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1¾ inch to ASME B18.2.1; <b>stainless steel</b> 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K46	7MF9411-5DC
Accessory set to DIN <sup>2)</sup>		
(connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9411-5A.		
2x screws M10x45 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K15	7MF9411-7BB
2x screws M10x45 to DIN EN 24014; stainless steel 2x washers Ø 10.5 mm to DIN 125, stainless steel; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K25	7MF9411-7BC

Fittlings - Shut-off valves for differential pressure transmitters

### 2-, 3- and 5-spindle valve manifolds DN 5

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup> Please add "-Z" to Article No. and specify Order code.		
for valve manifolds 7MF9411-5B. and -5C.		
4x screws M10x45 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160.	K16	7MF9411-6BB
4x screws M10x45 to DIN EN 24014; stainless steel 4x washers Ø 10.5 mm to DIN 125, stainless steel; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160.	K26	7MF9411-6BC
Mounting plate		
for valve manifold, made of electrogalvanized sheet-steel     for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg     Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	M11	7MF9006-6EA
- for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm) and fastening screws for mounting on valve manifold	M12	7MF9006-6GA
<ul> <li>for valve manifold, made of stainless steel</li> </ul>		
<ul> <li>for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg</li> <li>Scope of delivery: 1 mounting plate with bolts for</li> </ul>	M21	7MF9006-6EC
mounting on valve manifold  - for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M21, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	M22	7MF9006-6GC
Valve manifold 100 bar		
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) • for 7MF9411-5A. • for 7MF9411-5B. • for 7MF9411-5C.	S12 S13 S14	
NACE MR-0175-certified	D07	
incl. acceptance test certificate 3.1 to EN 10204		

<sup>1)</sup> When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.

### Accessories

### Accessory set for 2-, 3- and 5-spindle valve manifolds

### 2-spindle valve manifold DN 5

- K35: 2 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 1<sup>3</sup>/<sub>4</sub> inch to ASME B18.2.1, 1 flat gasket
- K15: 2 screws M10x45 to DIN EN 24014, 2 washers, 1 flat gasket

### 3-spindle and 5-way valve manifold DN 5

- K36: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 1<sup>3</sup>/<sub>4</sub> inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 to DIN EN 24014, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80  $^{\circ}$ C (176  $^{\circ}$ F)

**Note**: Flange connection with M10 screws only permissible up to PN 160!

### Mounting plate

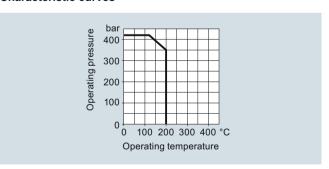
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid) Scope of delivery:
  - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

### Valve manifold 100 bar, suitable for oxygen

- S12: For 2-way valve manifold
- S13: For 3-way valve manifold
- S14: For 5-way valve manifold

### Characteristic curves



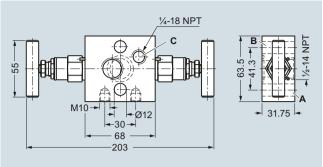
Valve manifolds PN 5 (7MF9411-5..), permissible working pressure as a function of the permissible working temperature

<sup>&</sup>lt;sup>2)</sup> Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

### Fittlings - Shut-off valves for differential pressure transmitters

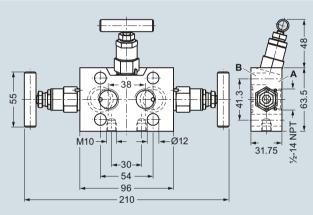
### 2-, 3- and 5-spindle valve manifolds DN 5

### Dimensional drawings



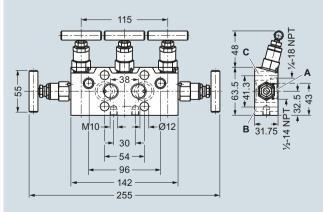
- A Process connection: 1/2-14 NPT
- B Transmitter connection: Flange connection to IEC 61518, form B
- C Vent / test connection: 1/4-18 NPT
- Valve design: external spindle thread

2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm



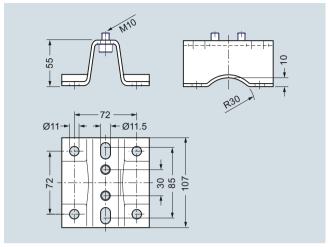
- A Process connection: ½-14 NPT
- B Transmitter connection: Flange connection to IEC 61518, form B Valve design: external spindle thread

3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm



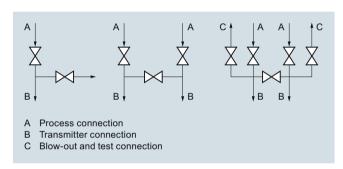
- A Process connection: ½-14 NPT
- B Transmitter connection: Flange connection to IEC 61518, form B
- C Vent / test connection: 1/4-18 NPT Valve design: external spindle thread

5-spindle valve manifold DN 5 (7MF9411-5C.), dimensions in mm  $\,$ 



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

### Schematics



2-spindle, 3-spindle and 5-spindle valve manifold DN 5, connections

### Fittlings - Shut-off valves for differential pressure transmitters

Multiway cocks PN 100

### Overview



Multiway cock PN 100 (1450 psi) (7MF9004-1P.) for differential pressure transmitters

The multiway cock PN 100 (1450 psi) can be flanged to pressure transmitters for differential pressure.

### Renefits

- · Version available for aggressive liquids, gases and vapors
- Robust design
- Oil-free and grease-free version possible
- One-hand operation

### Application

The PN 100 (1450 psi) multiway cock is available in versions for aggressive and non-aggressive liquids, gases and vapors.

### Design

The multiway cock can be flanged with four screws to pressure transmitters for differential pressure.

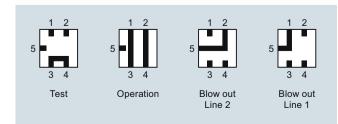
The PN 100 (1450 psi) has 2 process connections and one blowout connection. A steel version of the multiway cock is available for non-aggressive media, and a stainless steel version for aggressive media. The housing is forged in one piece. The switching lever is removable.

Sealing can be improved during operation.

**Note**: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

### Function

- Shutting off the differential pressure lines
- Blowing out the differential pressure lines
- Testing the pressure transmitter zero



Cock positions; the symbols are printed on the cock

### Technical specifications

Multiway cocks PN 100		
Measured medium	Water, non-aggressive liquids and gases	Aggressive liquids, gases and vapors
Material	P250GH, mat. No.: 1.0460	X 6 CrNiMoTi 17 12 2, mat. No. 1.4571/316Ti
Connections	Steel, for pipe Ø 12 mm, L series	Stainless steel, for pipe Ø 12 mm, L series
<ul><li>Process connection</li><li>Connection for blowing out</li></ul>		
Max. permissible working temperature	200 °C (392 °F)	
Max. permissible working pressure	100 bar (1450 psi) (up to max. 60 °C (140 °F))	
Weight	2.5 kg	

Selection and Ordering data	Article No.
Multiway cock PN 100 (1450 psi)	7MF9004-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for flanging to pressure transmitters, weight 2.5 kg (without accessory set), without certificate	
For water and non-aggressive gases and vapors	1 P
For aggressive liquids, gases and vapors	1 Q
Accessories	
Factory test certificate EN 10204–2.2 Material acceptance test certificate EN 10204-3.1	7MF9000-8AB 7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup> Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg) 4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1 inch to ASME B18.2.1; chromized steel 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)	L31	7MF9004-5CC
Accessory set to DIN (required for flanging, weight 0.2 kg) 4x screws M10x25 to DIN EN 24017; chromized steel, 4x washers Ø 10.5 mm to DIN 125; 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)		
Standard design     Version for oxygen (together with Order code S11	L11 L15	7MF9004-6AD 7MF9004-6AE
Multiway cock in oil-free and grease- free design		
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F), BAM-tested lubricant, gasket suitable for oxygen measurement (only with Article No. 7MF9004–1Q.Z)	S11	
Mounting bracket Required for wall mounting or for securing on rack (72 mm grid), made of electrogalvanized sheet-steel, weight 0.85 kg	M13	7MF9004-6AA
NACE MR-0175-certified	D07	
incl. acceptance test certificate 3.1 to EN 10204 (only available for version 7MF9004-1QA)		

<sup>1)</sup> When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.

Fittlings - Shut-off valves for differential pressure transmitters

### **Multiway cocks PN 100**

### Accessories

### Accessory set for multiway cock PN 100

- L31: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

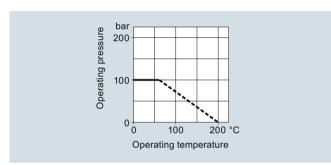
### Multiway cock in oil-free and grease-free design

 S11 (only for aggressive liquids, gases and vapors (7MF9004-1Q.)): Max. PN 63 (914 psi) (instead of PN 100 (1450 psi)), BAM-tested lubricant, gasket suitable for oxygen

### Mounting brackets

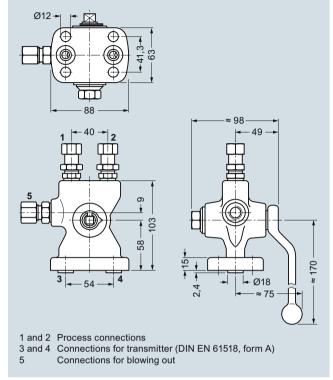
 M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

### Characteristic curves

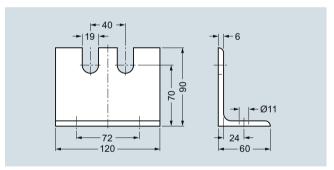


Multiway cock PN 100 (1450 psi), permissible operating pressure as a function of the permissible operating temperature

### Dimensional drawings



Multiway cock 7MF9004-1P. for flanging to pressure transmitters for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

Fittlings - Shut-off valves for differential pressure transmitters

### 3-way and 5-way valve manifolds DN 5

### Overview



The three-spindle and five-spindle valve manifolds DN 5 (7MF9410-1../-3..) are used to shut off the differential pressure lines and to check the transmitter zero.

In addition, the five-way valve manifold permits blowing out of the differential pressure lines.

### Benefits

- Available for aggressive and non-aggressive liquids and gases
- Max. working pressure 420 bar (6092 psi), with version for oxygen max. 100 bar (1450 psi)

### Application

The 3-way and 5-way valve manifolds are available in versions for aggressive and non-aggressive liquids and gases.

Mounting plates are available for wall mounting, for securing to mounting racks or for pipe mounting.

### Design

The process connection of the 3-way and 5-way valve manifolds is a pipe union with ferrule.

Both valve manifolds have 2 flange connections for connecting a pressure transmitter.

In addition, the five-way valve manifold has 2 blow-out connections.

Depending on the version the valve manifold has either 3 or 5 valves, each with an internal spindle thread.

### Materials used

	For non-aggressive liquids and gases		For aggre	
Component	Material	Mat. No.	Material	Mat. No.
Housing	P250GH	1.0460	X 6	1.4571/
Head parts	C 35	1.0501	CrNiMoTi 17 12 2	31611
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hardened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti		
Packings	PTFE	-	PTFE	-

### Function

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero
- In addition, the five-way valve manifold permits blowing out of the differential pressure lines.

Selection and Ordering data	Article No.
3-way valve manifold DN 5	7MF9410-
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, process connection: Pipe union with ferrule, max. working pressure 420 bar (6092 psi), weight 2.9 kg (order accessory set and mounting plate with Order code), without certificate	
• for non-aggressive liquids and gases	1 E
<ul> <li>for aggressive liquids and gases</li> </ul>	1 F
5-way valve manifold DN 5	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, process connection: Pipe union with ferrule, max. working pressure 420 bar (6092 psi), weight 4.4 kg (order accessory set and mounting plate with Order code), without certificate	
• for non-aggressive liquids and gases	3 E
• for aggressive liquids and gases	3 F
Accessories	
Factory test certificate EN 10204–2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

Fittlings - Shut-off valves for differential pressure transmitters

### 3-way and 5-way valve manifolds DN 5

3-way and 5-way valve manifo	IUS DIN 5	
Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 <sup>1</sup> / <sub>8</sub> inch to ASME B18.2; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	B31	7MF9010-5CC
4x screws $^{7}/_{16}$ -20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	B34	7MF9410-5CA
Accessory set to DIN <sup>2)</sup>		
(required for flanging, weight 0.2 kg) 4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
Standard design	B11	7MF9010-6AD
Version for oxygen	B15	7MF9010-6AE
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	B16	7MF9010-6CC
Mounting plate		
for valve manifold, made of electrogalvanized sheet-steel for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery:  1 mounting plate with bolts for mounting on valve manifold	M11	7MF9006-6EA
for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	M12	7MF9006-6GA
Valve manifold 100 bar		
suitable for oxygen		
for 7MF9410-1F	S13	
for 7MF9410-3F	S14	
nACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204 (only available for ver- sion 7MF9410-1FA and -3FA)	D07	

When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.

### Accessories

### Accessory set for 3-way and 5-way valve manifold DN 5 for flanging

- B31: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 2<sup>1</sup>/<sub>8</sub> inch to ASME B18.2.1, 2 flat gaskets
- B34: 4 screws  $^{7}/_{16}$ -20 UNF x  $2^{1}/_{8}$  inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B15 (suitable for oxygen): 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80  $^{\circ}$ C (176  $^{\circ}$ F)

O-ring to DIN 3771,  $20 \times 2.65 - S - FPM90$ , max. 420 bar (6092 psi),  $120 \, ^{\circ}\text{C}$  (248  $^{\circ}\text{F}$ )

Note: M10 screws only permissible up to PN 160 (2320 psi)!

### Mounting plate

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid) Scope of delivery:
  - 1 mounting plate 7MF9006-6EA with bolts for mounting on valve manifold
- M12: For pipe mounting Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max.
     Ø 60.3 mm

### Valve manifold 100 bar, suitable for oxygen

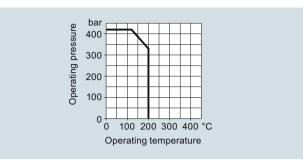
S12: Only in combination with versions for aggressive liquids and gases

<sup>2)</sup> Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

Fittlings - Shut-off valves for differential pressure transmitters

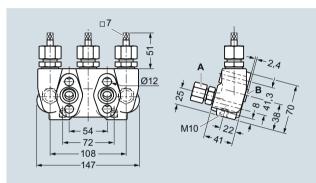
### 3-way and 5-way valve manifolds DN 5

### Characteristic curves



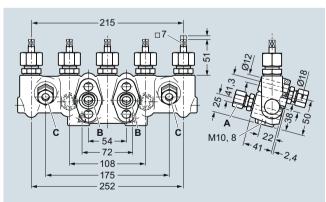
Permissible operating pressure as a function of the permissible operating temperature

### Dimensional drawings



- A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
- B Transmitter connection: Flange connection to EN 61518, form A Valve design: internal spindle thread

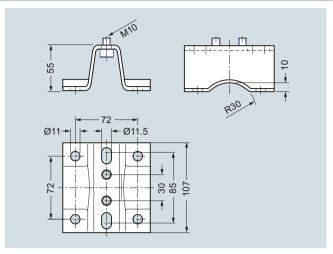
3-way valve manifold DN 5 (7MF9410-1..), dimensions in mm



- A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
- B Transmitter connection: Flange connection to EN 61518, form A
- C Blow-out connection: Pipe union with ferrule, diameter 12 mm, S series to DIN 2353

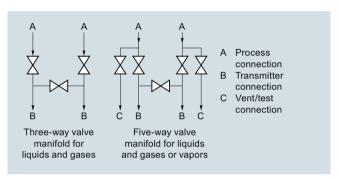
Valve design: internal spindle thread

5-way valve manifold DN 5 (7MF9410-3..), dimensions in mm



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

### Schematics



3-way and 5-way valve manifolds, connections

Fittlings - Shut-off valves for differential pressure transmitters

### 3-way valve manifold DN 8

### Overview



The 3-way valve manifold DN 8 (7MF9416-1../-2..) is for pressure transmitters for differential pressure. It is used to shut off and blow out differential pressure lines and to test the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to test the pressure transmitter characteristic.

### Benefits

- For aggressive and non-aggressive liquids and gases
- The maximum working pressure is 420 bar (6092 psi).

### Application

The 3-way valve manifold is available in versions for aggressive and non-aggressive liquids and gases.

Mounting plates are available for wall mounting, for securing to mounting racks or for pipe mounting.

### Design

For the process connection on the version for non-aggressive media it is possible to choose between a pipe union with ferrule and welding pins.

The version for aggressive media always has a pipe union with

Both versions are available optionally with a test connection M20x1.5.

The valves have an internal spindle thread.

### Materials used

			For aggre	
Component	Material	Mat. No.	Material	Mat. No.
Housing	P250GH	1.0460	X 6	1.4571/
Head parts	C 35	1.0501	CrNiMoTi 17 12 2	31611
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hard- ened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/316Ti		
Packings	PTFE	-	PTFE	-

### Function

The 3-way valve manifold DN 8 performs two functions as standard:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

All versions are also available with a test connection, to which a test device for checking the pressure transmitter characteristic can be connected.

Selection and Ordering data	Article No.
3-way valve manifold DN 8	7MF9416-
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, max. working pressure 420 bar (6092 psi), (order accessory set and mounting plate with Order code), without certificate	
For non-aggressive liquids and gases procedss connection: Pipe union with ferrule Ø 12 mm	
<ul> <li>without test connection</li> </ul>	1 B
• with test connection	1 C
For non-aggressive liquids and gases procedss connection: Welding pin Ø 14 x 2.5	
<ul> <li>without test connection</li> </ul>	2 C
• with test connection	2 D
For aggressive liquids and gases process connection: Pipe union with ferrule Ø 12 mm	
<ul> <li>without test connection</li> </ul>	1 D
• with test connection	1 E
Accessories	
Factory test certificate EN 10204–2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

### Fittlings - Shut-off valves for differential pressure transmitters

### 3-way valve manifold DN 8

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN		
(required for flanging, weight 0.2 kg)		
4x screws <sup>1</sup> / <sub>16</sub> -20 UNF x 2 <sup>1</sup> / <sub>8</sub> inch to ASME B18.2; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	B31	7MF9010-5CC
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 <sup>1</sup> / <sub>8</sub> inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	B34	7MF9410-5CA
Accessory set to DIN <sup>2)</sup>		
(required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	B11	7MF9010-6AC
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permiss-ble 420 bar (6092 psi), 120 °C (248 °F)	B16	7MF9010-6C0
Mounting plate		
For valve manifold, made of electrogalvanized sheet-steel		
for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	M11	7MF9006-6EA
for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	M12	7MF9006-6G <i>A</i>
NACE MR-0175-certified	D07	
incl. acceptance test certificate 3.1 to EN 10204 (only available for version 7MF9416-1DA and -1EA)		

When ordering accessory set or mounting together with the valve manifold, please use Order code; otherwise use Article No. Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

### Accessories

### Accessory set for 3-way valve manifold DN 8 for flanging

- B31: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 2<sup>1</sup>/<sub>8</sub> inch to ASME B18.2.1, 2 flat gaskets
- $\bullet$  B34: 4 screws  $^7\!/_{16}$ -20 UNF x  $2^1\!/_{8}$  inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 to DIN EN 24014. 4 washers. 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176°F)

O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

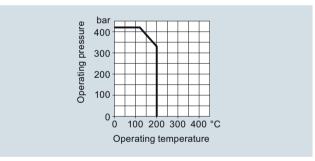
Note: M10 screws only permissible up to PN 160 (2320 psi)!

### Mounting plate

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid) Scope of delivery:
- 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

### Characteristic curves

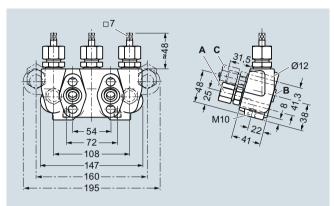


3-way valve manifold DN 8, permissible working pressure as a function of the permissible working temperature

Fittlings - Shut-off valves for differential pressure transmitters

### 3-way valve manifold DN 8

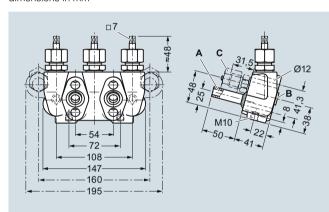
### Dimensional drawings



- A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
- B Transmitter connection: Flange connection to EN 61518, form A
- C Test connection: M20 x 1,5

Valve design: internal spindle thread

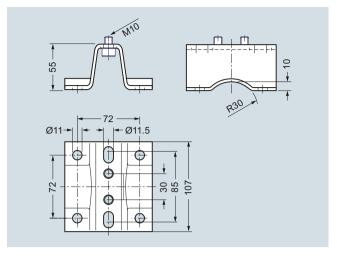
3-way valve manifold DN 8 (7MF9416-1..) with pipe union, dimensions in mm



- A Process connection (e.g. on primary device): Welding pin, diameter 14 x 2,5
- B Transmitter connection: Flange connection to EN 61518, form A
- C Test connection: M20 x 1,5

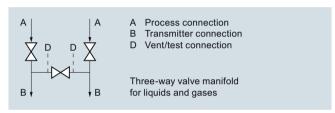
Valve design: internal spindle thread

3-way valve manifold DN 8 (7MF9416-2..) with welding pin, dimensions in  $\ensuremath{\mathsf{mm}}$ 



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

### Schematics



3-way valve manifold DN 8, connections

# Fittlings - Shut-off valves for differential pressure transmitters

# Valve manifold combination DN 5/DN 8

# Overview



The valve manifold combination DN 5/DN 8 (7MF9416-6..) is for pressure transmitters for differential pressure.

The combination is used to shut off and blow out differential pressure lines and to test the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to test the pressure transmitter characteristic.

## Benefits

• Max. working pressure 420 bar (6092 psi)

# Application

The valve manifold combination DN 5/DN 8 is designed for vapors.

# Design

The valve manifold combination DN 5/DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as as flange connection, while the blow-out connection is designed as a pipe union with ferrule.

The manifold valves have an internal spindle thread, while the blow-out valves have an external spindle thread.

The optional test connections are M20x1.5.

#### Materials used

	Valve manifold DN 5		Blow-out val	ves DN 8
Component	Material	Mat. No.	Material	Mat. No.
Housing	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tem- pered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

# Function

- Shutting off the differential pressure lines
- · Blowing out the differential pressure lines
- Checking the pressure transmitter zero

As an option it is possible to order a version with a test connection, to which a test device for checking the transmitter characteristic can be connected.

Selection and Ordering data	Article No.
Valve manifold combination DN 5/DN 8 for vapors	7 M F 9 4 1 6 - 6 A
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, max. working pressure 420 bar (6092 psi), also available in stainless steel on request (order accessory set with Order code), without certificate	
• without test connection	С
$\bullet$ with test connection M20 $ imes$ 1.5	D
Accessories	
Factory test certificate EN 10204-2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 <sup>1</sup> / <sub>8</sub> inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permiss-ble 420 bar (6092 psi), 120 °C (248 °F)	В34	7MF9410-5CA
Accessory set to DIN <sup>2)</sup> (required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F);Flange connection to DIN 19213 only permissible up to PN 160!	B16	7MF9010-6CC
0		

<sup>1)</sup> When ordering accessory set together with the valve manifold combination, please use Order code; otherwise use Article No.

 $<sup>^{2)}\,</sup>$  Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

Fittlings - Shut-off valves for differential pressure transmitters

# Valve manifold combination DN 5/DN 8

#### Accessories

#### Accessory set for valve manifold combination DN 5/DN 8 for flanging

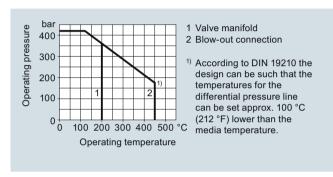
- B34: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 2<sup>1</sup>/<sub>8</sub> inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

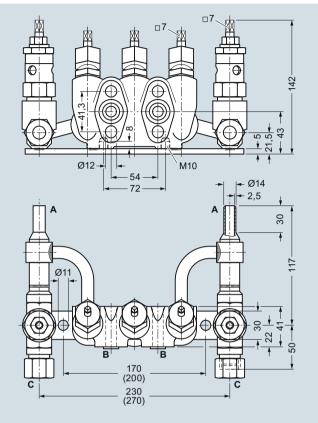
Note: M10 screws only permissible up to PN 160 (2321 psi)!

#### Characteristic curves



Permissible operating pressure as a function of the permissible operating temperature

# Dimensional drawings



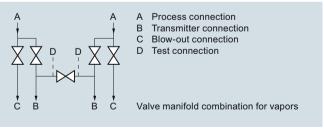
- Process connection (e.g. on primary device): Welding pin Transmitter connection: Flange connection to EN 61518, form A
- Blow-out connection: Pipe union with ferrule, diameter 14 mm, S series to DIN 2353

Valve design:

- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 5/DN 8 (7MF9416-6C.), dimensions in mm (deviating dimensions for 7MF9416-6D. shown in brackets)

# Schematics



Valve manifold combination DN 5/DN 8, connections

Fittlings - Shut-off valves for differential pressure transmitters

#### Valve manifold combination DN 8

# Overview



The valve manifold combination DN 8 (7MF9416-4..) is for pressure transmitters for differential pressure.

It is used to shut off and blow out the differential pressure lines and to check the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to check the pressure transmitter characteristic.

#### Benefits

• Max. working pressure 420 bar (6092 psi)

# Application

The valve manifold combination DN 8 is designed for vapors.

# Design

The valve manifold combination DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as as flange connection, while the blow-out connection is designed as a pipe union with ferrule.

The manifold valves have an internal spindle thread, while the blow-out valves have an external spindle thread.

The optional test connection is M20x1.5.

The valve manifold combination DN 8 is supplied with a mounting plate.

## Materials used

	Valve manifold		Blow-out valves	
Component	Material	Mat. No.	Material	Mat. No.
Housing	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tem- pered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

# Function

- Shutting off the differential pressure lines
- Blowing out the differential pressure lines
- Checking the pressure transmitter zero

As an option it is possible to order a version with a test connection, to which a test device for checking the pressure transmitter characteristic can be connected.

Selection and Ordering data	Article No.
Valve manifold combination DN 8 for vapors	7 M F 9 4 1 6 - A
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for flanging to pressure transmitters for differential pressure, with mounting plate, max. working pressure 420 bar (6092 psi), also available in stainless steel on request (order accessory set with Order code), without certificate	
• without test connection	4 C
$\bullet$ with test connection M20 $ imes$ 1.5	4 D
Accessories	
Factory test certificate EN 10204-2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)  4x screws 7/x-20 LINE x	B34	7MF9410-5CA
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 <sup>1</sup> / <sub>8</sub> inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)		
Accessory set to DIN <sup>2)</sup> (required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) Flange connection to DIN 19 213 only permissible up to PN 160!	B16	7MF9010-6CC
41		

- 1) When ordering accessory set together with the valve manifold combination, please use Order code; otherwise use Article No.
- 2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

#### Accessories

# Accessory set for valve manifold combination DN 8 for flanging

- $\bullet\,$  B34: 4 screws  $^7/_{16}$  -20 UNF x  $2^1/_8$  inch to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

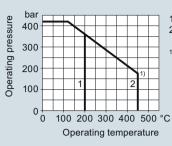
O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

Fittlings - Shut-off valves for differential pressure transmitters

# Valve manifold combination DN 8

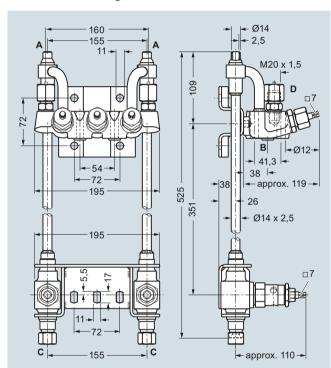
# Characteristic curves



- 1 Valve manifold2 Blow-out connection
- 1) According to DIN 19210 the design can be such that the temperatures for the differential pressure line can be set approx. 100 °C (212 °F) lower than the media temperature.

Permissible operating pressure as a function of the permissible operating temperature

# Dimensional drawings



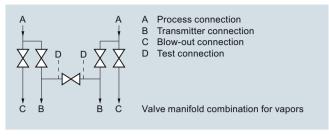
- A Process connection (e.g. on primary device): Welding pin
- B Transmitter connection: Flange connection to EN 61518, form A
- C Blow-out connection: Pipe union with ferrule, diameter 14 mm, S series to DIN 2353

D Test connection (only with Article No. 7MF9416-4D.):  $M20 \times 1,5$  Valve design:

- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 8 (7MF9416-4..), dimensions in mm

# Schematics



Valve manifold combination DN 8, connections

# Fittlings - Shut-off valves for differential pressure transmitters

# 2-, 3- and 5-spindle valve manifolds for installing in protective boxes

# Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds (7MF9412-1...) are used to shut off the differential pressure lines and to check the transmitter zero.

The five-spindle valve manifold permits venting on the transmitter side and checking of the transmitter characteristic.

These valve manifolds are preferentially used when mounting in protective boxes. In addition, they can also be used for wall, frame or pipe mounting together with the mounting bracket.

Transmitters of the DS series can be operated and read from the front when using these valve manifolds.

# Application

The valve manifolds DN 5 are designed for liquids and vapors and for installing in protective boxes.

Each is available in a version for oxygen on request

#### Design

All versions of the spindle manifolds have a process connection ½-14 NPT.

The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection 1/4-18 NPT.

The valves have an external spindle thread.

# Materials used

Components	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

# Functions

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- · Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data	Article No.
Valve manifolds DN 5 for mounting in protective boxes	7 M F 9 4 1 2 - A
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for liquids and gases for flanging to pressure transmitters for absolute and differential pressure Material: stainless steel, mat. No: 1.4404/316L max. working pressure 420 bar (6092 psi) (order accessory set with Order code), without certificate	
$\bullet$ 2-spindle valve manifold with rotatng sleeve $G1\!\!/_{\!\!2}$	1 B
<ul> <li>2-spindle valve manifold with flange connection</li> </ul>	1 C
• 3-spindle valve manifold	1 D
• 5-spindle valve manifold	1 E
Accessories	
Factory test certificate EN 10204–2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9412-1C.		
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 inch to ASME B18.2.1; chromized steel 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	F32	7MF9412-6CA
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 inch to ASME B18.2.1; chromized steel 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <sup>2</sup> )	F35	7MF9412-6DA
for valve manifold 7MF9412–1D and -1E.		
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 inch to ASME B18.2.1; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) <sup>2)</sup>	F34	7MF9412-6GA
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 2 inch to ASME B18.2.1; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <sup>2)</sup>	F36	7MF9412-6HA

# Fittlings - Shut-off valves for differential pressure transmitters

# 2-, 3- and 5-spindle valve manifolds for installing in protective boxes

	0 1 1	A :: 1 N
Selection and Ordering data  Further designs <sup>1)</sup>	Order code	Article No.
Please add "-Z" to Article No. and specify Order code.		
Accessory set to DIN		
(connection between valve manifold and pressure transmitter)  For valve manifold 7MF9412–1C.		
2x screws M10x50 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) <sup>2)</sup>	F12	7MF9412-6AA
2x screws M10x50 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <sup>2)</sup> For valve manifold 7MF9412–1D and	F15	7MF9412-6BA
<u>-1E.</u>		
4x screws M10x50 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) <sup>2)</sup>	F14	7MF9412-6EA
4x screws M10x50 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <sup>2)</sup>	F16	7MF9412-6FA
Mounting bracket		
required for wall mounting or for securing to mounting rack, with bolts for mounting on valve manifold		
• for valve manifolds 7MF9412-1B. and -1C.	M14	7MF9006-6LA
• for valve manifold 7MF9412-1D.	M17	7MF9006-6NA
• for valve manifold 7MF9412-1E.	M18	7MF9006-6PA
Mounting clip		
2 off, to secure mounting bracket to pipe	M16	7MF9006-6KA
Valve manifold 100 bar		
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
• for valve manifolds 7MF9412-1B. and -1C.	S12	
• for valve manifold 7MF9412-1D.	S13	
• for valve manifold 7MF9412-1E.	S14	
NACE MR-0175-certified	D07	
incl. acceptance test certificate 3.1 to EN 10204		

When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.

# Accessories

# Accessory set for 2-, 3- and 5-spindle valve manifolds (Connection between manifold and transmitter)

2-spindle valve manifold DN 5 with flange connection

- F32: 2 screws 7/16 20 UNF x 2 inch to ASME B 18.2.1, 1 O Ring (FPM90)
- F35: 2 screws 7/16 20 UNF x 2 inch to ASME B 18.2.1, 1 flat-gasket
- F12: 2 screws M10x50 to DIN EN 24014, 2 washers, 1 O-ring (FPM90)
- F15: 2 screws M10x50 to DIN EN 24014, 2 washers, 1 flat gasket

#### 3-spindle and 5-way valve manifold DN 5

- F34: 4 screws 7/16 20 UNF x 2 inch toASME B 18.2.1, 2 O-rings (FPM90)
- F36: 4 screws 7/16 20 UNF x 2 inch toASME B 18.2.1, 2 flat-gaskets
- F14: 4 screws M10x50 to DIN EN 24014, 4 washers, 2 O-rings (FPM90)
- F16: 4 screws M10x50 to DIN EN 24014, 4 washers, 2 flat-gaskets

Washers Ø 10.5 to DIN 125

Flat-gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 - S - FPM90; max.420 bar (6092 psi), 120 °C (248 °F)

#### Note:

Flange connections with M10 screws only permissible up to PN 160 (2321 psi)!

# Mounting bracket for wall mounting or for securing to mounting rack

With bolds for mounting on valve manifold

- M14: For 2-spindle valve manifold DN 5
- M17: For 3-spindle valve manifold DN 5
- M18: For 5-spindle valve manifold DN 5

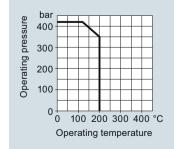
## Mounting clips (2 off)

 M16: For securing the mounting brackets M14, M17 and M18 to pipe

# Valve manifold 100 bar, suitable for oxygen

- S12: For 2-spindle valve manifold DN 5
- S13: For 3-spindle valve manifold DN 5
- S14: For 5-spindle valve manifold DN 5

# Characteristic curves



420 bar (6092 psi) at 120 °C (248 °F) 350 bar (5076 psi) at 200 °C (392 °F)

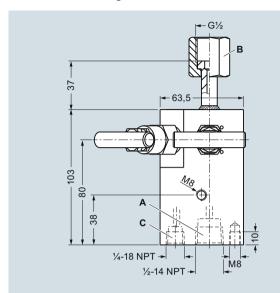
Permissible operating pressure as a function of the permissible operating temperature

<sup>2)</sup> Flange connections with M10 screws only permissible up to PN 160 (2321 psi)!

# Fittlings - Shut-off valves for differential pressure transmitters

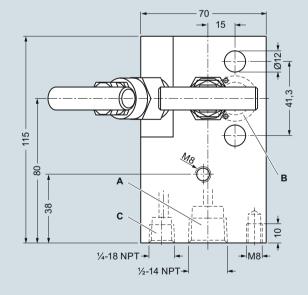
# 2-, 3- and 5-spindle valve manifolds for installing in protective boxes

# Dimensional drawings



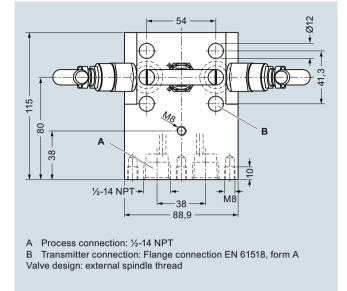
- A Process connection: ½-14 NPT
- B Transmitter connection: Nipple to DIN 16284, G1/2, SW 27
- C Vent / test connection: 1/4-18 NPT

2-spindle valve manifold DN 5 (7MF9412-1B..) with rotating sleeve, dimensions in mm

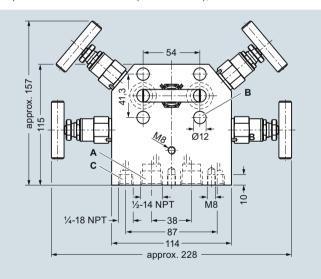


- A Process connection: 1/2-14 NPT
- B Transmitter connection: Flange connection to EN 61518, form A
- C Vent / test connection: 1/4-18 NPT Valve design: external spindle thread

2-spindle valve manifold DN 5 (7MF9412-1C..), dimensions in mm



3-spindle valve manifold DN 5 (7MF9412-1D..), dimensions in mm

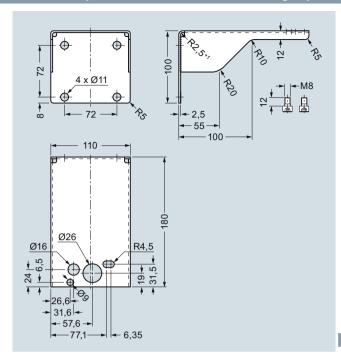


- A Process connection: ½-14 NPT
- B Transmitter connection: Flange connection to EN 61518, form A
- C Vent / test connection: 1/4-18 NPT Valve design: external spindle thread

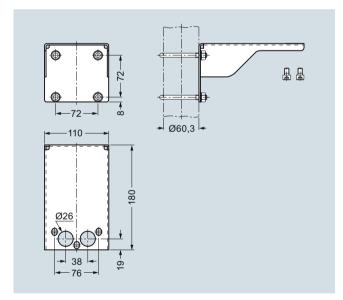
5-spindle valve manifold DN 5 (7MF9412-1E..), dimensions in mm

# Fittlings - Shut-off valves for differential pressure transmitters

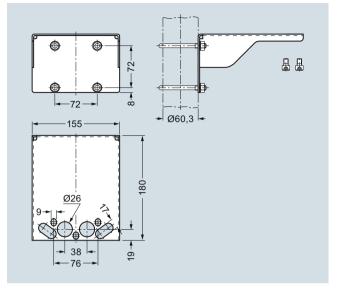
# 2-, 3- and 5-spindle valve manifolds for installing in protective boxes



Mounting bracket (7MF9006-6LA)/(M14) for 2-spindle valve manifolds, dimensions in mm  $\,$ 

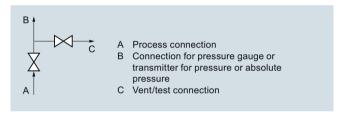


Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifolds, dimensions in mm  $\,$ 

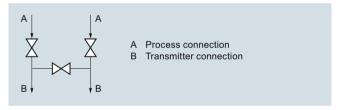


Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifolds, dimensions in mm

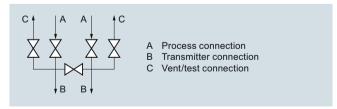
# Schematics



2-spindle valve manifold DN 5 (with rotating sleeve  $G \ensuremath{\mathbb{Z}}_2$  or flange connection), connections



3-spindle valve manifold DN 5, connections



5-spindle valve manifold DN 5, connections

Fittlings - Shut-off valves for differential pressure transmitters

# 3- and 5-spindle valve manifolds for vertical angular differential pressure lines

# Overview



These 3-spindle and 5-spindle valve manifolds 7MF9413-1.. were developed specially for vertical differential pressure lines.

The valve manifolds are used to shut off the differential pressure lines and to check the pressure transmitter zero.

The 5-spindle valve manifold permits venting on the transmitter side and checking of the pressure transmitter characteristic.

#### Benefits

- For vertical differential pressure lines
- Max. operating pressure 420 bar (6092 psi)
- Transmitters of the DS series can be operated and read from the front.

# Application

The 3-spindle and 5-spindle valve manifolds for vertical differential pressure lines are for liquids and gases. The valve manifolds are flanged on the pressure transmitter.

#### Design

All versions of the spindle valve manifolds have a process connection  $\frac{1}{2}$ -14 NPT.

The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, form B .

The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection 1/4-18 NPT.

# Materials used:

Component	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

# Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data	Article No.
Valve manifolds for vertical differential pressure lines	7 M F 9 4 1 3 -
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for liquids and gases for flanging to pressure transmitters for abso- lute and differential pressure Material: stainless steel, mat. No: 1.4404/316L max. working pressure 420 bar (6092 psi) (order accessory set with Order code), without certificate	
• 3-spindle valve manifold	1 D
• 5-spindle valve manifold	1 E
Accessories	
Factory test certificate EN 10204–2.2	7MF9000-8AB
Material acceptance test certificate EN 10204-3.1	7MF9000-8AD

214 1020 1 0.1		
Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>	Order code	Alticle No.
Please add "-Z" to Article No. and specify Order code.		
Accessory set to EN (connection between valve manifold and pressure transmitter)		
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1¾ inch to ASME B18.2.1; chro- mized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	K36	7MF9411-5DB
Accessory set to DIN <sup>2)</sup>		
(connection between valve manifold and pressure transmitter)		
4x screws M10x45 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); Flange connection with M10 screws only permissible up to PN 160 (2321 psi).	K16	7MF9411-6BB
Mounting bracket		
required <b>for wall mounting</b> or for securing to mounting rack, with bolts for mounting on valve manifold		
• for valve manifold 7MF9413-1D.	M17	7MF9006-6NA
• for valve manifold 7MF9413-1E.	M18	7MF9006-6PA
required <b>for mounting on 2" stand- pipe</b> , with bolts for mounting on valve manifold		
• for valve manifold 7MF9413-1D.	M19	7MF9006-6QA
Mounting clip		
2 off, to secure mounting bracket to pipe	M16	7MF9006-6KA
Valve manifold 100 bar (1450 psi) suitable for oxygen		
• for valve manifold 7MF9413-1D.	S13	
• for valve manifold 7MF9413-1E.	S14	
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	D07	
1) When ordering accessory set or mount	ing together with	the multiway cock

- When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.
- 2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

Fittlings - Shut-off valves for differential pressure transmitters

# 3- and 5-spindle valve manifolds for vertical angular differential pressure lines

#### Accessories

# Accessory set (connection between manifold and transmitter)

- K36: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 1¾ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 to DIN EN 24014, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80  $^{\circ}$ C (176  $^{\circ}$ F)

**Note**: Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

# Mounting bracket for wall mounting or for securing to mounting rack

With bolts for mounting on valve manifold

- M17: For 3-spindle valve manifold
- M18: For 5-spindle valve manifold

#### Mounting bracket for mounting on 2" standpipe

With bolts for mounting on valve manifold

• M19: For 3-spindle valve manifold

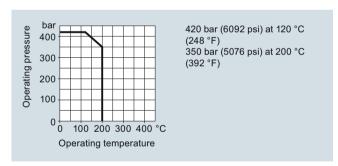
# Mounting clips (2 off)

For securing the mounting brackets M17, M18 and M19 to pipe

# Valve manifold 100 bar, suitable for oxygen

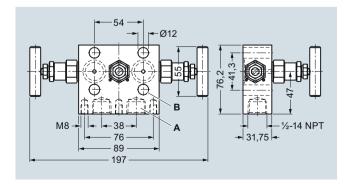
- For 3-spindle valve manifold
- For 5-spindle valve manifold

# Characteristic curves

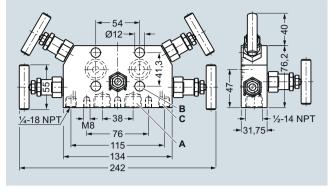


Permissible operating pressure as a function of the permissible operating temperature

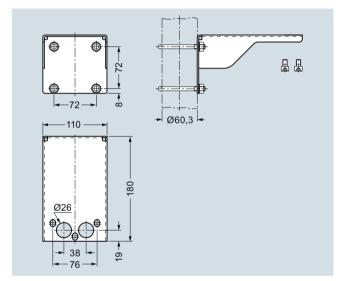
# Dimensional drawings



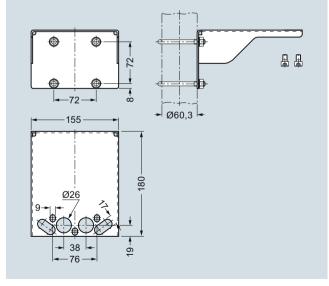
3-spindle valve manifold 7MF9413-1D. for vertical differential pressure lines, dimensions in  $\mbox{\sc mm}$ 



5-spindle valve manifold 7MF9413-1E. for vertical differential pressure lines, dimensions in mm



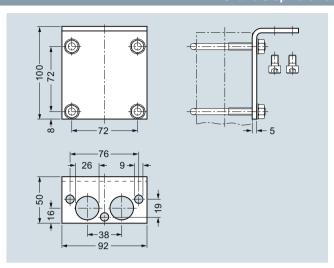
Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifolds, dimensions in mm



Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifolds, dimensions in mm

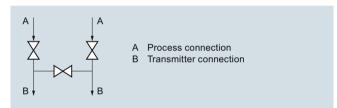
Fittlings - Shut-off valves for differential pressure transmitters

# 3- and 5-spindle valve manifolds for vertical angular differential pressure lines

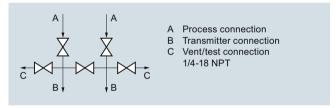


Mounting bracket (7MF9006-6QA)/(M19) for 3-spindle valve manifolds, dimensions in mm  $\,$ 

# Schematics



3-spindle valve manifold for vertical differential pressure lines, connections



5-spindle valve manifold for vertical differential pressure lines, connections

Fittlings - Shut-off valves for differential pressure transmitters

# Low-pressure multiway cock

# Overview



The low-pressure multiway cock 7MF9004-4CA/-4DA can be flanged to pressure transmitters for differential pressure.

#### Benefits

- Robust design
- For liquids and gases
- One-hand operation

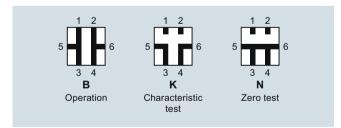
# Design

The multiway cock has 2 process connections and 2 test connections, which are available in 2 versions (with sealing screws  $G^3/_8$  or quick-release couplings). The housing is made of hotpressed brass CuZn39Pb3, CW 614N. Test connections with sealing screws or with self-sealing quick-release couplings.

**Note:** An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

# Function

- Shutting off the differential pressure lines
- Testing the pressure transmitter zero
- Testing the pressure transmitter characteristic



Cock positions; the symbols are printed on the cock

Selection and Ordering data	Article No.
Low-pressure multiway cock for liquids and gases, for flanging to pressure transmitters, max. working pressure 25 bar (363 psi), max. working temperature 60 °C (140 °F) (up to 80 °C (176 °F) for a short time), weight 1.75 kg (without accessory set)	
Test connections	
2x sealing screws G <sup>3</sup> / <sub>8</sub>	7MF9004-4CA
2x quick-release couplings	7MF9004-4DA
Accessories	
Test report to EN 10204-3.1	7MF9000-8AB
Material acceptance test certificate to EN 10204-3.1	7MF9000-8AD

Selection and Ordering data	Order code	Article No.
Further designs <sup>1)</sup>		
Please add " <b>-Z</b> " to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1 inch to ASME B18.2.1; chromized steel 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)	L31	7MF9004-5CC
Accessory set to DIN		
(required for flanging, weight 0.2 kg)		
4x screws M10x25 to DIN EN 24017; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)		
Standard design	L11	7MF9004-6AD
Version for oxygen	L15	7MF9004-6AE
Multiway cock in oil-free and grease-free design BAM-tested lubricant, gasket suitable for oxygen	S11	
Mounting bracket required for wall mounting or for securing on rack (72 mm grid), made of electrogalvanized sheet- steel, weight 0.85 kg	M13	7MF9004-6AA

<sup>1)</sup> When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.

Fittlings - Shut-off valves for differential pressure transmitters

Low-pressure multiway cock

# Accessories

# Accessory set for low-pressure multiway cock

- L31: 4 screws <sup>7</sup>/<sub>16</sub>-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

# Multiway cock in oil-free and grease-free design

• S11: BAM-tested lubricant, gasket suitable for oxygen

# Mounting brackets

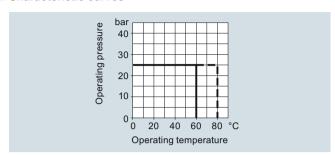
 M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

# Options

Test connections

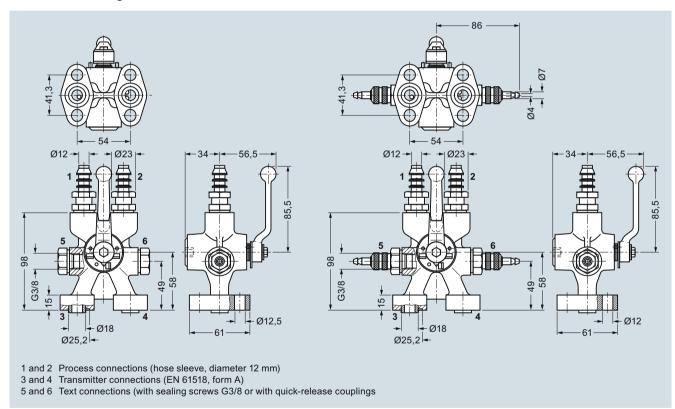
- 2 sealing screws G<sup>3</sup>/<sub>8</sub>
- 2 quick-release couplings

# Characteristic curves

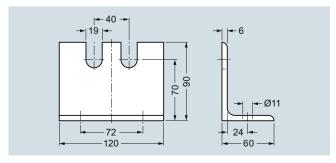


Low-pressure multiway cock, permissible operating pressure as a function of the permissible operating temperature

# Dimensional drawings



Low-pressure multiway cock 7MF9004-4CA/-4DA for direct flanging to pressure transmitters for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

Fittings - Accessories

# **Oval flange**

#### Overview



The oval flange 7MF9408-2C. for pressure transmitters for absolute pressure and differential pressure has a  $\frac{1}{2}$ -14 NPT female thread and is designed for max. operating pressure 400 bar (5800 psi).

#### Accessories

# Accessory set for oval flange

- $\bullet$  E36: 2 screws  $^{7}\!/_{16}\text{-}20$  UNF x 1½ inch to ASME B18.2.1, 1 flat gasket
- $\bullet$  E34: 2 screws  $^7\!/_{16}\text{-}20$  UNF x  $11\!\!/_{\!\!2}$  inch to ASME B18.3, 1 O-ring (FPM 90)
- E13: 2 screws M10x40 to DIN EN 4762, 2 washers, 1 O-ring (FPM 90)
- E16: 2 screws M10x40 to DIN EN ISO 4762, 2 washers, 1 flat gasket

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

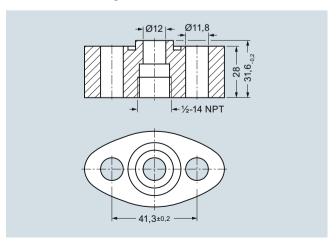
Note: M10 screws only permissible up to PN 160 (2321 psi)!

Selection and Ordering data	Article No.
Oval flange	
with female thread ½-14 NPT, max. working pressure 420 bar (6092 psi), flange connection to IEC 61518, form A	
Material	
P250GH, mat. No.: 1.0460	7MF9408-2CE
X 2 CrNiMo 17 13 2 mat No. 1 //0//316	7ME9408-2CI

7. 2 011 mm 0 11 10 2, man 110 1110 110	.02		
Selection and Ordering data	Order co	nda	Article No.
Further designs <sup>1)</sup>	Order of	Juc	7111010 140.
Please add "-Z" to Article No. and specify Order code.			
Accessory set to EN			
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1½ inch to ASME B 18.2.3; chro- mized steel 1x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	E36		7MF9408-5DA
2x screws <sup>7</sup> / <sub>16</sub> -20 UNF x 1½ inch to ASME B 18.2.3; chro- mized steel 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	E34		7MF9408-5CA
Accessory set to DIN			
2x screws M10x40 to DIN EN ISO 4762; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) <sup>2)</sup>	E13		7MF9408-6AA
2x screws M10x40 to DIN EN ISO 4762; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <sup>2</sup>	E16		7MF9408-6BA
NACE MR-0175-certified	D07		
incl. acceptance test certificate 3.1 to EN 10204			

<sup>1)</sup> When ordering accessory set together with the oval flange, please use Order code; otherwise use Article No.

# Dimensional drawings



Oval flange 7MF9408-2C., dimensions in mm

<sup>2)</sup> Flange connections with M10 screws only permissible up to PN 160 (2321 psi)

Fittings - Accessories

**Adapters** 

# Overview

Adapters enable e.g. a transition from medium connections with NPT thread to shut-off valves to DIN 16270 ... 16272 or pipes in conjunction with a connection gland (e.g. 7MF9008).

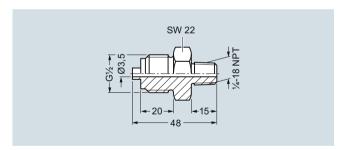
# Design

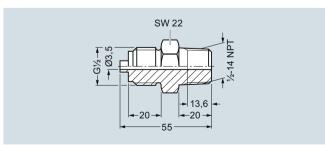
The connection pieces are made of X 6 CrNiMoTi 17 12 2, mat. No. 1.4571 and available in 3 versions

- Thread 1/4-18 NPT and connection shank G1/2 to DIN EN 837-1
- Thread ½-14 NPT and connection shank G½ to DIN EN 837-1
- Thread ½-14 NPT and thread ½-14 NPT

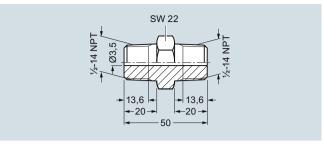
Selection and Ordering data	Article No.
Adapter	
(weight 0.2 kg)	
with thread $\frac{1}{4}$ -18 NPT – $\frac{G}{2}$	7MF9001-1AA
with thread $\frac{1}{2}$ -14 NPT – $\frac{G}{2}$	7MF9001-1CA
with thread ½-14 NPT – ½-14 NPT	7MF9001-1DA
with thread ½-14 NPT - M20 x 1.5	7MF9001-1EA
with pipe union with ferrule 12 S, $\varnothing$ 12 mm – ½-14 NPT	
• 9 SMnPb 28, mat. No. 1.0718	7MF9008-1CA
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	7MF9008-1CB
with pipe union with ferrule 14 S, $\varnothing$ 14 mm – $\frac{1}{2}$ -14 NPT	
• 9 SMnPb 28, mat. No. 1.0718	7MF9008-1CC
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	7MF9008-1CD

# Dimensional drawings

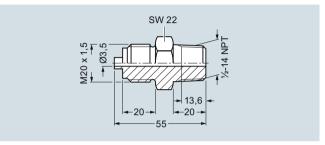




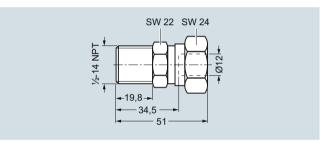
Connection piece with thread 12-14 NPT and connection shank G1/2 (7MF9001-1CA), dimensions in mm



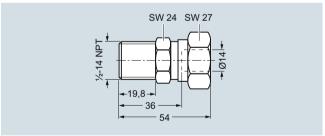
Connection piece with thread  $\frac{1}{2}$ -14 NPT and thread  $\frac{1}{2}$ -14 NPT (7MF9001-1DA), dimensions in mm



Connection piece with thread  $\frac{1}{2}$ -14 NPT and connection shank M20 x 1.5 (7MF9001-1EA), dimensions in mm



Connection piece with pipe union with ferrule 12 S,  $\varnothing$  12 mm and thread ½-14 NPT (7MF9008-1CA and -1CB), dimensions in mm



Connection piece with pipe union with ferrule 14 S,  $\varnothing$  14 mm and thread  $\frac{1}{2}$ -14 NPT (7MF9008-1CC and -1CD), dimensions in mm

Fittings - Accessories

# **Connection glands**

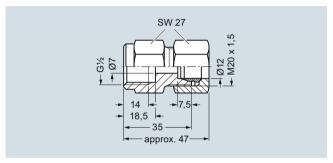
# Overview

Connection glands to connect medium or differential pressure lines to collars  $G1\!\!\!/_{\!2}$  to DIN EN 837-1

- For rated pressures up to PN 630 (9137psi)
- For oxygen only up to PN 250 (3626 psi)

Selection and Ordering	Article No.	
Connection screwed g for pipelines (weight 0.2 kg)	land	
Material	<u>Design</u>	
11SMn30 (mat. No. 1.0715)	Standard	7MF9008-1GA
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Standard	7MF9008-1GB
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Grease-free	7MF9008-1GC

# Dimensional drawings



Connection gland 7MF9008-1G., dimensions in mm

Fittings - Accessories

**Connection parts G 1/2** 

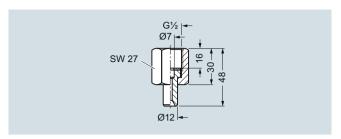
# Overview

Connection parts  $G1\!\!/_{\!2}$  for pressure gauges and shut-off fittings are available in 3 versions:

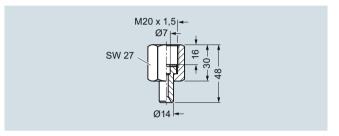
- Nipple connection
- Clamping sleeve
- Collar connection piece

Selection and Orderi	ng data	Article No.	
Adapters G½ for pressure gauges and shut-off fittings  Nipple connection G½ to DIN 16284 (union nut with nipple and gasket); max. working pressure 400 bar (5802 psi); weight 0.1 kg; connection: G½ to DIN EN 837-1; Female thread G½			
Material	Mat. No.		
CuZn39Pb3	CW 614N	M56340-A0001	
Union nut 9 SMn 28 k Nipple:	1.0715	M56340-A0002	
RSt 37-2	1.0037		
Union nut X 8 CrNiS 18 9 Nipple:	1.4305	M56340-A0003	
X 6 CrNiMoTi 17 12 2	1.4571/316Ti		
and gasket); max. wo (5802 psi); weight 0.1 connection: M20 x 1.5	M20 x 1.5 to DIN 16284 (union nut with nipple and gasket); max. working pressure 400 bar (5802 psi); weight 0.1 kg; connection: M20 x 1.5 to DIN EN 837-1; Female thread M20 x 1.5		
	Mat. No.	1450040 40000	
Union nut X 8 CrNiS 18 9 Nipple:	1.4305	M56340-A0008	
X 6 CrNiMoTi 17 12 2	1.45/1/31611		
Clamping sleeve G½ to DIN 16283; max. working pressure 400 bar (5802 psi); weight 0.1 kg; Connections: G½ to DIN EN 837-1; Female thread: G½ right-hand G½ left-hand			
Material	Material         Mat. No.           CuZn39Pb3         CW614N		
CuZn39Pb3			
9 SMn 28 k	1.0715	M56340-A0005	
Collar-adapter			
max. working pressur Connections: G½ to D Male thread: G½, G½	DIN EN 837-1;		
Material	Mat. No.		
CuZn39Pb3	CW614N	M56340-A0006	
9 SMn 28 k	1.0715	M56340-A0007	

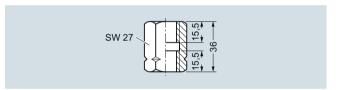
# Dimensional drawings



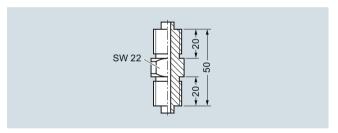
Nipple connection G% (M56340-A0001 to -A0003), dimensions in mm



Nipple connection M20 x 1.5 (M56340-A0008), dimensions in mm



Clamping sleeve (M56340-A0004/-A0005), dimensions in mm



Collar connection piece (M56340-A0006/-A0007), dimensions in mm

Fittings - Accessories

# Water traps, Sealing rings to EN 837-1

#### Overview

Water traps protect pressure gauges and shut-off fittings from heating up (e.g. by steam) by the water column produced by the water trap.

The max. working temperature is 120 °C (248 °F) at 100 bar (1450 psi), 300 °C (572 °F) at 80 bar (1160 psi) or 400 °C (752 °F) at 63 bar (914 psi). If the temperature of the measured medium is higher, a sufficiently long line has to be connected upstream of the trap to enable heat dissipation.

# Design

The water traps are available in U shape (type B) or circular shape (type D) to DIN 16282. They have a weld-on end Ø 20 mm × 2.6 mm on the measurement side. The connection on the device side is a clamping sleeve G½ to DIN 16283.

The water traps are made of steel (P250GH) or stainless steel (X 6 CrNiMoTi 17 12 2)

Water traps are designed as standard for max. operating temperature 120 °C (248 °F) at max. operating pressure 100 bar (1450 psi) (300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi). Water traps for higher operating pressures and temperatures are available on request.

#### Selection and Ordering data Article No.

# Water traps

for pressure gauges and pressure transmitters, max. working temperature 120 °C (248 °F), max. working pressure 100 bar (1450 psi) (or 300 °C (572 °F) at 80 bar (1160 psi), or 400 °C (752 °F) at 63 bar (914 psi)), weight 0.7 kg

#### Water trap B to DIN 16282

<u>Ma</u>terial Mat. No. P235GH 1.0345 X 6 CrNiMoTi 17 12 2 1.4571/316Ti

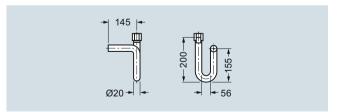
Water trap D to DIN 16282

Material Mat. No. P235GH 1.0345 X 6 CrNiMoTi 17 12 2 1.4571/316Ti M56340-A0043

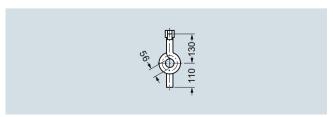
M56340-A0061

M56340-A0045 M56340-A0063

# Dimensional drawings



Water traps, type B, M56340-A0043/-A0061, dimensions in mm

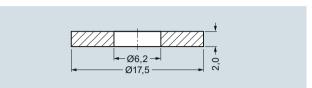


Water traps, type D, M56340-A0045/-A0063, dimensions in mm

# Overview

The sealing rings to EN 837-1 are required to seal measuring instruments for pressure with the process connection G½B.

# Dimensional drawings



Sealing ring 7MF9007-7A. to EN 837-1, dimensions in mm

Selection and Ordering data	Article No.
Sealing ring to EN 837-1 for thread G½ made of (packing unit 100 pcs)	
• Copper	7MF9007-7AA
• Soft iron	7MF9007-7AB
• Stainless steel, matNo. 1.4571	7MF9007-7AC
• PTFE	7MF9007-7AD
Accessories	
Test report to EN 10204-3.1	7MF9000-8AB
Material acceptance test certificate to EN 10204-3.1	7MF9000-8AD

Fittings - Accessories

Pressure surge reducers

# Overview

The pressure surge reducer protects the pressure gauge against damage, premature wear and tear and inaccurate/fluctuating indications.

# Application

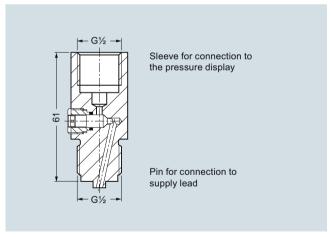
The pressure reducer is used when pulsations occur in the measured medium (e.g. in slow-running vapor engines, piston pumps and compressors), or if drastic fluctuations are likely to occur in the measured medium (e.g. in hydraulic presses and tensile testing machines).

# Design

- Enclosure made of brass or stainless steel (mat. no. 1.4571)
- Adjustable nozzle
- Sleeve for connection to the measuring instrument
- Pin for connection to supply lead

Selection and Ordering data			Article No.
Pressure surge reducer Weight approx. 0.21 kg			
Material	Full-scale value	Weight approx. in kg	
Brass	250 bar (3626 psi)	0.21	M56340-A54
Stainless steel	600 bar (8702 psi)	0.21	M56340-A59

# Dimensional drawings



Pressure surge reducer, dimensions in mm

Fittings - Accessories

# **Primary shut-off valves**

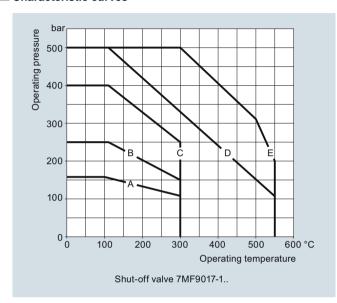
# Overview

Primary shut-off valves are available in the following versions:

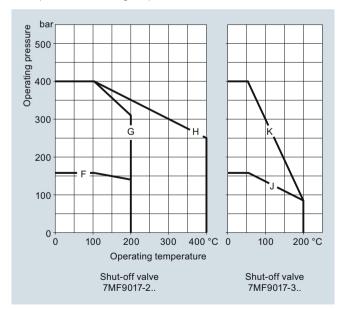
- For non-corrosive liquids, gases and vapors
- For corrosive liquids and gases
- Grease-free for oxygen

The shut-off valves are available in various materials and with various connections (see Selection and Ordering data)

# Characteristic curves

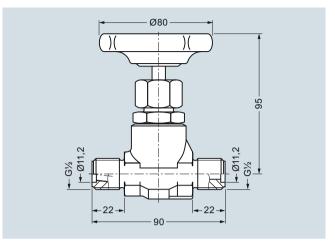


Shut-off valve 7MF9017-1..., permissible working pressure as a function of the permissible working temperature

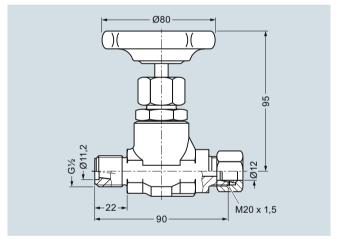


Shut-off valve 7MF9017-2.. and -3.., permissible working pressure as a function of the permissible working temperature  $\,$ 

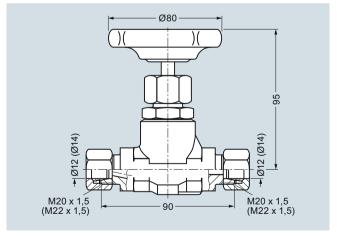
# Dimensional drawings



Shut-off valve 7MF9017-1A., dimensions in mm



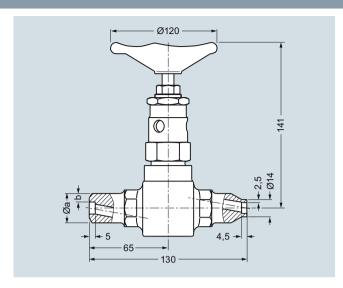
Shut-off valve 7MF9017-1B. and -2B., dimensions in mm



Shut-off valves 7MF9017-1C., -1D. and -2C., dimensions in mm

Fittings - Accessories

Primary shut-off valves



Shut-off valves 7MF9017-, dimensions in mm

Ø A x b	7MF9017-
14 mm x 2.5 mm	1F. and 1G.
21.3 mm x 6.3 mm	1H. and 2H.
24 mm x 7.1 mm	1J., 1K. and 2J.

Selection and Ordering	data	
Drimary chut-off valvee	without	cortificato

Max. working pressure	Charac- teristic <sup>1)</sup>		Mat. No.	Spindle thread	Connections	Approx. weight kg	Article No.
Shut-off valve fo	r non-aggi	ressive liquids, gases	and vapo	rs			7MF9017-1
✓ Click on the Ar	ticle No. fo	or the online configuration	on in the F	IA Life Cy	cle Portal.		
160 bar (2321 psi	) A	P250GH	1.0460	Internal	Threaded socket G½ form R, DIN 19207	0.8	Α
160 bar (2321 psi	) A	P250GH	1.0460	Internal	Threaded socket G½ form R, DIN 19207 DIN 19207 and pipe union with ferrule for pipe Ø 12 mm, S series	0.8	В
400 bar (5800 psi	) C	P250GH	1.0460	Internal	Pipe union with ferrule for pipe Ø 12 mm, S series	1	С
400 bar (5800 psi	) C	P250GH	1.0460	Internal	Pipe union with ferrule for pipe Ø 14 mm, S series	1	D
500 bar (7252 psi	) D	16 Mo 3	1.5415	External	Welding sleeves Ø 14 mm x 2.5 mm	1.6	F
500 bar (7252 psi	) E	11 CrMo 9 10	1.7383	External	Welding sleeves Ø 14 mm x 2.5 mm	1.6	G
500 bar (7252 psi	) D	16 Mo 3	1.5415	External	Welding sleeves $\varnothing$ 21.3 mm $\times$ 6.3 mm and $\varnothing$ 14 mm $\times$ 2.5 mm	1.6	Н
500 bar (7252 psi	) D	16 Mo 3	1.5415	External	Welding sleeves $\varnothing$ 24 mm $\times$ 7.1 mm and $\varnothing$ 14 mm $\times$ 2.5 mm	1.6	J
500 bar (7252 psi	) E	11 CrMo 9 10	1.7383	External	Welding sleeves $\varnothing$ 24 mm $\times$ 7.1 mm and $\varnothing$ 14 mm $\times$ 2.5 mm	1.6	K
Shut-off valve fo	r aggressi	ve liquids and gases					7MF9017-2
160 bar (2321psi)	F	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	Internal	Threaded socket G½ form R, DIN 19207 DIN 19207 and pipe union with ferrule for pipe Ø 12 mm, S series	0.8	В
400 bar (5800 psi	) G	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	Internal	Pipe union with ferrule for pipe Ø 12 mm, S series	1	С
400 bar (5800 psi	) H	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	External	Welding sleeves $\varnothing$ 21.3 mm $\times$ 6.3 mm and $\varnothing$ 14 mm $\times$ 2.5 mm	1.6	н
400 bar (5800 psi	) H	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	External	Welding sleeves $\varnothing$ 24 mm $\times$ 7.1 mm and $\varnothing$ 14 mm $\times$ 2.5 mm	1.6	J
Accessories							
Factory test certifi Material acceptan		0204-2.2 rtificate EN 10204-3.1					7MF9000-8AB 7MF9000-8AD

<sup>1)</sup> See Figure "Permissible working pressure as a function of the permissible working temperature"

Fittings - Accessories

# **Compensation vessels**

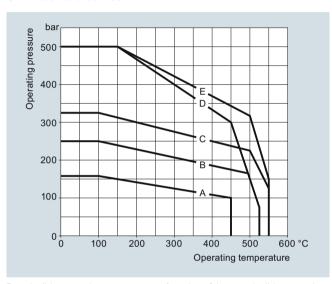
#### Overview

The compensation vessels prevent the level difference which occurs with pressure changes in the pressure lines and which falsifies the measurement.

According to DIN 19211, the temperature in the compensation vessel must be assumed to be 50 K less than the steam temperature in the pipe when calculating the wall thicknesses. This is because the temperature in the compensation vessel during operation can only rise up to the saturated steam temperature.

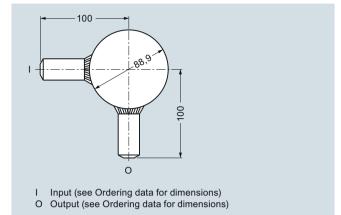
A material acceptance test certificate A to EN 10204-3.1 is available for the materials from which the compensation vessels are made.

# Characteristic curves

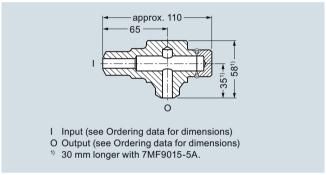


Permissible operating pressure as a function of the permissible operating temperature

# Dimensional drawings



Compensation vessel 7MF9015-1.., dimensions in mm



7MF9000-8AB 7MF9000-8AD

Compensation vessel 7MF9015-5.., dimensions in mm

### Selection and Ordering data

Compensation ves	ssel, witho	out certificate						
Max. working pressure	Charac- teristic <sup>1)</sup>	Material	Mat. No.	Connections Input	Output	Approx. contents cm <sup>3</sup>	Approx. weight kg	Article No.
								7MF9015-
✓ Click on the Arti	cle No. for	the online cor	figuration	in the PIA Life Cycle Port	tal.			
160 bar (2321 psi)	А	16 Mo 3	1.5415	Threaded socket G½, form R, DIN 19207	Threaded socket G½, form V, DIN 19207	250	0.8	1 A
250 bar (3626 psi)	В	16 Mo 3	1.5415	Welding sleeve Ø 21.3 mm × 6.3 mm	Welding sleeve Ø 21.3 mm × 6.3 mm	250	0.8	1 B
250 bar (3626 psi)	В	16 Mo 3	1.5415	Welding sleeve Ø 24 mm × 7.1 mm	Welding sleeve Ø 24 mm × 7.1 mm	250	1	1 C
500 bar (7252 psi)	Е	11 CrMo 9 10	1.7383	Welding sleeve Ø 24 mm × 7.1 mm	Welding sleeve Ø 24 mm × 7.1 mm	170	1	1 D
250 bar (3626 psi)	В	16 Mo 3	1.5415	Welding sleeve Ø 33.7 mm × 4.5 mm	Welding sleeve Ø 24 mm × 7.1 mm	700	0.7	1 E
160 bar (2321 psi)	Α	16 Mo 3	1.5415	Threaded socket G½, form R, DIN 19207	Threaded socket G½, form V, DIN 19207	20	1.6	5 A
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve Ø 21.3 mm × 6.3 mm	Welding sleeve Ø 21.3 mm × 6.3 mm	20	1.6	5 B
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve Ø 24 mm × 7.1 mm	Welding sleeve Ø 24 mm × 7.1 mm	20	1.6	5 C
500 bar (7252 psi)	Е	11 CrMo 9 10	1.7383	Welding sleeve Ø 24 mm x 7.1 mm	Welding sleeve Ø 24 mm × 7.1 mm	20	1.6	5 D

Accessories

Factory test certificate EN 10204-2.2

Material acceptance test certificate EN 10204-3.1

<sup>1)</sup> See Figure "Permissible working pressure as a function of the permissible working temperature"

Fittings - Accessories

Connection parts

# Overview

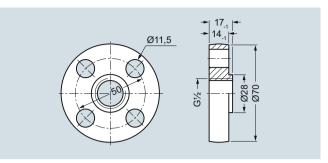
Connection parts are available in the following versions:

- Threaded flange pair G½ with stainless steel gasket
- Nipple G½ form V to DIN 19207
- Union nut G½ made of C 35 to DIN 16284
- Gasket B½ (grooved) to DIN 19207

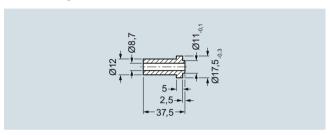
All connection parts are also available grease-free for oxygen.

Selection and Ordering data	Article No.
Threaded flange pair G½	
• with stainless steel gasket	7MF9007-4CA
<ul> <li>grease-free for oxygen, with stainless steel gasket</li> </ul>	7MF9007-4DA
Scope of delivery:	
2x threaded flanges G½ to DIN 19207; material: P250GH (mat. No. 1.0460)	
4x hexagon screws M10x45 to DIN EN 24014; Material: C35E (mat. No. 1.1181)	
4x hexagon screws M10x50 to DIN EN 24032	
1x gasket G½ (7MF9007-6BA) grooved, to DIN 19207; Material: X 6 CrNiMoTi 17 12 2 (mat. No. 14571/316Ti)	
Only for 7MF9007-4CA!	
1x gasket G½ (7MF9k007-6CA), grease-free for oxygen, grooved, to DIN 19207; Material: X 6 CrNiMoTi 17 12 2 (mat. No. 14571/316Ti) Only for 7MF9007-4DA!	
Nipple G½	
to DIN 19207	
• Material: 16 Mo 3 (mat. No. 1.5415)	7MF9007-4KA
<ul> <li>grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)</li> </ul>	7MF9007-4LA
Union nut G½	
to DIN 16284	
• Material: C35E (mat. No. 1.1181)	7MF9007-4MA
<ul> <li>grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)</li> </ul>	7MF9007-4NA
Gasket G½	
to DIN 19207, grooved	
<ul> <li>Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)</li> </ul>	7MF9007-6BA
<ul> <li>grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)</li> </ul>	7MF9007-6CA

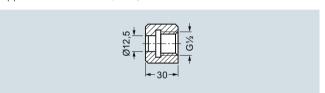
# Dimensional drawings



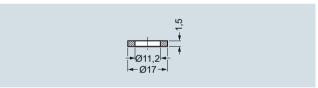
Threaded flange 7MF9007-4CA/-4DA, dimensions in mm



Nipple G½ 7MF9007-4KA/-4LA, dimensions in mm



Union nut  $G\frac{1}{2}$  7MF9007-4MA/-4NA, dimensions in mm



Gasket 7MF9007-6BA/-6CA, dimensions in mm

1

Notes

# 2

# **Temperature Measurement**



2/2 2/6 2/28 2/33 2/37	Product overview  SITRANS TS Technical description Detailed product overview Conversion assistance old appliance Ordering examples  SITRANS TS100 Cable, mineral-insulated  SITRANS TS200	2/94 2/95 2/96 2/97 2/98	Resistance thermometers Temperature transmitters for mounting in the connection head Questionnaire for temperature sensors (resistance thermometers and thermocouples) Flue gas resistance thermometers, with connection head Resistance thermometers for damp rooms Accessories – Welding-type protective
2/42	Compact, mineral-insulated		tubes, neck tubes and connection heads
2/46 2/50	SITRANS TS300 For food, pharmaceuticals and biotechnology - Modular design - Clamp-on design	2/100 2/101 2/102	Thermocouples Technical description Straight thermocouples - to DIN 43733, with connection head - Individual parts and accessories
2/54	SITRANS TS500 Type 2, tubular version without process		Transmitters for mounting in sensor head
2/58	connection  Type 2N, tubular version, with screw socket	2/104 2/108	SITRANS TH100 two-wire system (Pt100) SITRANS TH200 two-wire system universal
2/62 2/66	Type 2G, tubular version, with screw socket and extension Type 2F, tubular version, with flange and	2/115	SITRANS TH300 two-wire system universal, HART SITRANS TH400 fieldbus transmitter
2/70	extension Type 3, tubular quick, without process connection	2/128	Transmitters for rail mounting SITRANS TR200 two-wire system
2/74 2/78	Type 3G, tubular quick, with screw socket and extension Type 3F, tubular quick, with flange and	2/135	universal SITRANS TR300 two-wire system universal, HART
2/82	extension Type 4+4F barstock thermowell, with	2/142	SITRANS TW four-wire system universal, HART
2/86	extension For the installation of existing protective tubes	2/154 2/159 2/168	Transmitters for field mounting SITRANS TF280 WirelessHART SITRANS TF two-wire system SITRANS TF fieldbus transmitter
2/90	SITRANS TSinsert  Measuring inserts for retrofits and upgrades - European and American type	2/159	Field indicator SITRANS TF Field indicator for 4 to 20 mA

You can download all instructions, catalogs and certificates for SITRANS T free of charge at the following Internet address: www.siemens.com/sitranst

Siemens FI 01 · June 2015

# **Temperature Measurement** Product overview

# Overview

	Туре	Description	Page	Software for parameterization
Temperature sensors				
	TS100	<ul><li>Cable connection</li><li>Universal use</li><li>For unfavorable space conditions</li><li>Mineral-insulated</li></ul>	2/38	-
	TS200	<ul> <li>Compact version</li> <li>Universal use</li> <li>Mineral-insulated</li> <li>For unfavorable space conditions</li> </ul>	2/42	-
	TS300	Resistance thermometer for food, pharmaceiticals and biotechnology		
		Modular design, for installation in pipelines and tanks	2/46	
Manual Action of the Control of the		Clamp-on design, for attachment on the pipe primarily for sterilization processes	2/50	
	TS500, Type 2	<ul> <li>For the process industry (piping and tanks)</li> <li>Tubular thermowell for minimal to medium stress</li> <li>Thermowell as per DIN 43772, Type 2 without process connection</li> <li>Without extension, plug-in or use with moveable compression fittings</li> </ul>	2/54	-
	TS500, Type 2N	<ul> <li>For the process industry (vessels and pipings)</li> <li>Tubular thermowell for minimal to medium stress</li> <li>Thermowell Type 2N similar to DIN 43772, screwed in</li> <li>Without extension, connection head not adjustable</li> </ul>	2/58	
	TS500, Type 2G	<ul> <li>For the process industry (vessels and pipings)</li> <li>Tubular version for minimal to medium stress</li> <li>Thermowell as per DIN 43722, Type 2G, screwed in</li> <li>With extension</li> </ul>	2/62	-
	TS500, Type 2F	<ul> <li>For the process industry (vessels and pipings)</li> <li>Tubular version for minimal to medium stress</li> <li>Thermowell as per DIN 43722, Type 2F with flange</li> <li>With extension</li> </ul>	2/66	

# **Temperature Measurement**

Product overview

	Туре	Description	Page	Software for parameterization
	TS500, Type 3	For the process industry (vessels and pipings)     Tubular thermowell for minimal to medium stress     Thermowell as per DIN 43722, Type 3 without process connection, improved response time     Without extension, plug-in or use with moveable compression fittings	2/70	-
	TS500, Type 3G	For the process industry (vessels and pipings)     Tubular version for minimal to medium stress     Thermowell as per DIN 43722, Type 3G, screwed in, improved response time     With extension	2/74	-
	TS500, Type 3F	<ul> <li>For the process industry (vessels and pipings)</li> <li>Tubular thermowell for minimal to medium stress</li> <li>Thermowell as per DIN 43722, Type 3F with flange, improved response time</li> <li>With extension X</li> </ul>	2/78	-
	TS500, Type 4 TS500, Type 4F	<ul> <li>For the process industry (vessels and pipings)</li> <li>Barstock thermowell for medium to highest stress</li> <li>Thermowell as per DIN 43722</li> <li>Type 4 for weld-in</li> </ul>	2/82	-
	TS500, installation	<ul> <li>Type 4F with flange</li> <li>For the process industry (vessels and pipings)</li> <li>For the installation of existing thermowells</li> <li>Suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001</li> <li>With European or American type extension</li> </ul>	2/86	-
Measuring inserts for temperatu	re sensors			
	European type	Replaceable     Mineral-insulated	2/90	
	American type		2/92	-
Temperature sensors for combu	stion processes and dam	p rooms		
	Flue gas resistance thermometers	Largest measuring range: -50 +600 °C (-58 +1112 °F)	2/96	
	Resistance thermometers for damp rooms	Largest measuring range: -30 +60 °C (-22 +140 °F)	2/97	
	Straight thermocouples	Largest measuring range: 0 1250 °C (32 2282 °F)	2/101	

# **Temperature Measurement** Product overview

	Application	Mounting of tra	ansmitter with	Page	Software for parameterization
		Transmitter	Sensor		
Temperature transmitter for he	ad mounting				
SIMENS	SITRANS TH100 Transmitters for Pt100 • Two-wire system	Zone 2, zone 1	Zone 2, zone 1, zone 0	2/104	SIPROM T
SI MESS	SITRANS TH200 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • Two-wire system • Universal	Zone 2, zone 1	Zone 2, zone 1, zone 0	2/108	SIPROM T
SIEMENS STATE OF THE PROPERTY	SITRANS TH300  Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V  • Two-wire system  • Universal  • HART	Zone 2, zone 1	Zone 2, zone 1, zone 0	2/115	SIMATIC PDM
	SITRANS TH400  Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.9 V  Fieldbus transmitters  PROFIBUS PA  FOUNDATION fieldbus	Zone 2, zone 1, zone 21	Zone 2, zone 1, zone 0, zone 21, zone 20	2/122	SIMATIC PDM for TH 400 with PROFIBUS PA
Temperature transmitters for ra	ail mounting				
HEALTH STATE OF THE STATE OF TH	SITRANS TR200  Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V  • Two-wire system  • Universal	Zone 2, zone 1, zone 21	Zone 2, zone 1, zone 0, zone 21, zone 20	2/128	SIPROM T
HAMASON PARTY OF THE PARTY OF T	SITRANS TR300 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V  • Two-wire system  • Universal  • HART	Zone 2, zone 1, zone 21	Zone 2, zone 1, zone 0, zone 21, zone 20	2/135	SIMATIC PDM

# **Temperature Measurement**

Product overview

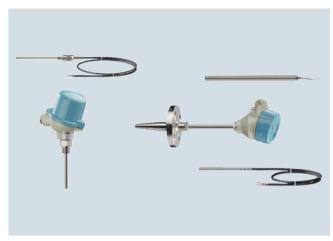
	Application	Mounting of tra Ex protection	ansmitter with	Page	Software for parameterization	
		Transmitter	Sensor			
	SITRANS TW  Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples, DC voltages and DC currents for:  • Four-wire system	Safe area	Zone 1, zone 0, zone 21, zone 20	2/142	SIMATIC PDM	
Temperature transmitters for fi	eld mounting					
	SITRANS TF280 Transmitter for connection to resistance-based sensor In field enclosure for heavy industrial use battery-operated WirelessHART	-	-	2/154	Local operation via buttons SIMATIC PDM local with HART modem and wireless via WirelessHART	
92 71	SITRANS TF  Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V  In field enclosure for heavy industrial use  HART, Universal	Zone 2, zone 1	Zone 2, zone 1, zone 0	2/159	Depending on the installed TH200/TH300 transmitter	
1100 Art 1-	SITRANS TF Fieldbus transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.8 V • In field enclosure for heavy industrial use • PROFIBUS PA • FOUNDATION fieldbus	Zone 2, zone 1	Zone 2 zone 1, zone 0	2/168	SIMATIC PDM for PROFIBUS PA	
Field indicator for 4 to 20 mA s	ignals					
92 TH	SITRANS TF Field indicator for 4 to 20 mA signals Display of units can be user-defined	Zone 2, zone 1	-	2/159		

# **Temperature Measurement**

# SITRANS TS

# **Technical description**

# Overview



Temperature sensors of the SITRANS TS product family are used to measure temperatures in industrial equipment.

Siemens offers the following temperature sensors:

- SITRANS TS100
- General use
- Compact design with connection cable
- SITRANS TS200
  - General use
  - Compact design with plug/wire ends
- SITRANS TS300
  - Use n food, pharmaceuticals and biotechnology
  - Modular or clamp-on design
- SITRANS TS500
  - General use
  - Modular design with connection head and thermowell

# Benefits

The modular design makes it possible to customize the temperature sensor for most applications, while still being able to use many standardized individual components.

# Application

Depending on the specification, sensors can be combined with different connection heads, neck tubes and process connections. As a result, the sensors can be used in a large number of technical applications in the following industries:

- · Chemical industry
- · Petrochemical industry
- Power engineering
- Primary industry
- · Pharmaceutical industry
- Biotechnology
- Food manufacturing

#### SITRANS TS100 and SITRANS TS200

Temperature sensors of the SITRANS TS100 series are cable thermometers with different electrical connection options (e.g. plug, soldered connections, connection cables)

The SITRANS TS200 series of compact thermometers is charcterized by a compact design. Both temperature sensor series are suitable for the following:

- Measurements of temperatures of solids, where additional thermowells are not required for replacements done during ongoing operations, e.g. bearing block temperature.
- Measurements which are particularly critical with regard to response times. The advantages offered by an additional thermowell are purposely omitted.
- Measuring points which must be easy to convert or relocate.
- Surface temperature measurements: The temperature sensor is used in conjunction with a surface connection piece.
- Cost-effective transport: The mineral-insulated design allows for economically feasible transport even at large lengths. From a length of 0.8 m (2.63 ft), the sensors can be delivered rolled up or bended.

# SITRANS TS300 temperature sensors for food, pharmaceuticals and biotechnology

The temperature sensors of the SITRANS TS300 series are thermometers especially designed for measurements with high hygienic demands, such as in the food, pharmaceutical and biotechnology industries. The basic versions are:

- Thermometers in modular design with replaceable measuring insert and process connections usual in the industry
- Clamp-on thermometers for measurement of the pipe surface temperature without interrupting the process

## SITRANS TS500 Temperature sensors as a module system

Due to their modular design, temperature sensors of the SITRANS TS500 series are well suited to a large number of applications.

The replaceable measuring insert makes it possible to conduct maintenance work even during ongoing operations. These devices are used particularly frequently in vessels and pipelines of the following industries:

- Power stations
- · Chemical industry
- Petrochemical industry
- · General process engineering
- · Water, waste water

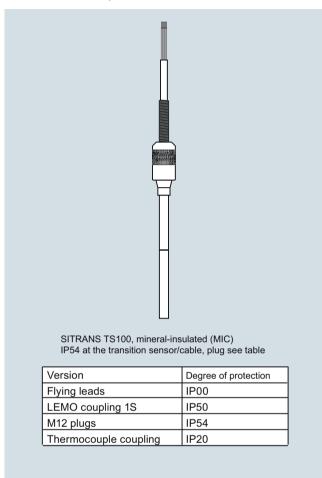
# Temperature Measurement SITRANS TS

**Technical description** 

# Design

# SITRANS TS100 7MC711xx

The following image illustrates the available designs for SITRANS TS100 temperature sensors:



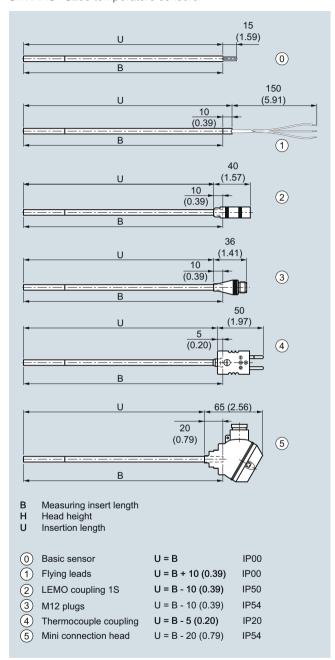
#### SITRANS TS100

The following types of process connections can be implemented:

- · Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

# SITRANS TS200 7MC712xx

The following image illustrates the available designs for SITRANS TS200 temperature sensors:



SITRANS TS 200, dimensions in mm (inch)

The following types of process connections can be implemented:

- · Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

# **Temperature Measurement**

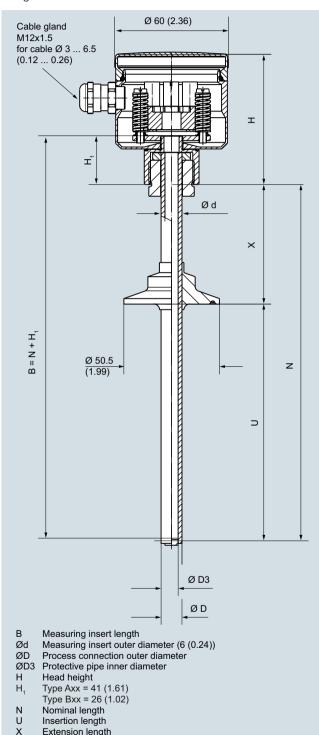
SITRANS TS

#### **Technical description**

#### SITRANS TS300

#### SITRANS TS300 modular design

The following figure shows the available versions and components of the SITRANS TS300 temperature sensors in modular design.



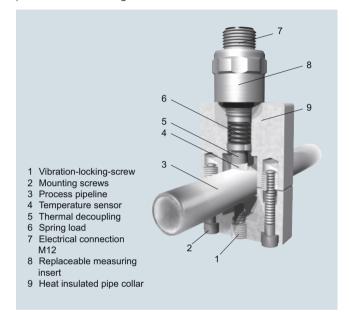
SITRANS TS modular design, dimensions in mm (inch)

#### SITRANS TS300 Clamp-on

Temperature measurement is carried out over a modified and quick-response Pt100 measuring element, which is positioned and insulated over a pipe collar made of heat-resistant plastic.

The measuring insert contains a special temperature sensor tip made of silver, which is pressed evenly onto the pipeline by means of a spring.

The compulsory guide of the replaceable measuring insert ensures even pressure contact on the pipeline, which ensures a reproducible measuring result.



#### Design

Measuring insert

- Special measuring insert made of stainless steel; hygienic design
- Measuring element made of silver, thermal decoupling through plastic insert

Measuring insert screwed into collar with spring load. Use heat-conductive-compound (see accessories) prior to mounting the device.

# Pipe collar

Material

Temperature resistant high-performance plastic with integrated insulating system in the hygienic design

• Ambient temperature influence

Approx. 0.2 %/10 K

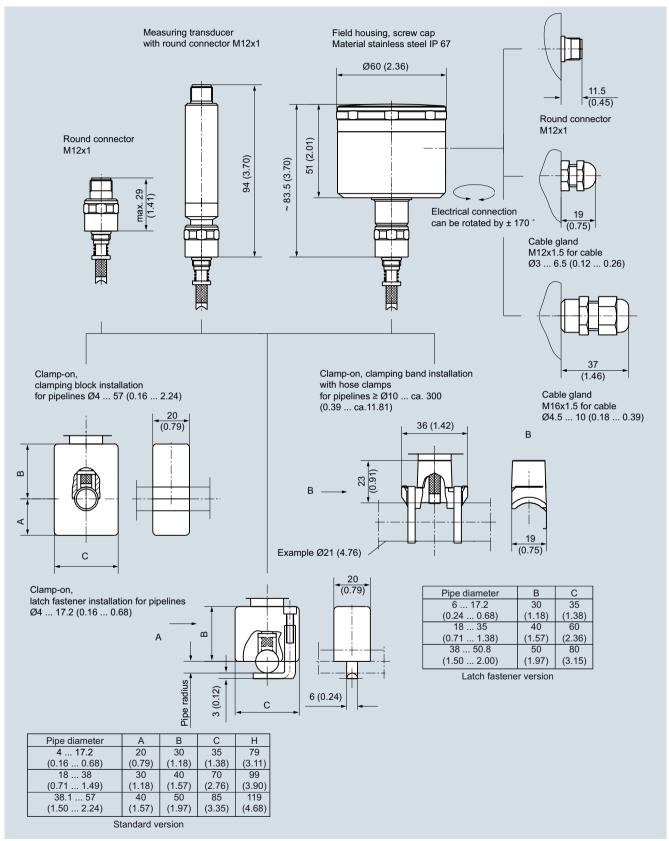
The pipe diameter of the measuring tube is required for correct device selection. For special sizes, you start by selecting the matching collar size and entering the required size in plain text. Space-saving designs are available (latch fastener version) for installation in a limited space (e.g., tube bundles).

For correct assignment after recalibration, the collar as well as the measuring insert are identified with serial number and pipe diameter. This information can also be engraved.

# Temperature Measurement SITRANS TS

# **Technical description**

The following figure illustrates the available designs and components for SITRANS TS300 temperature sensors in clamp-on design:



SITRANS TS300 clamp-on design, round connector, field enclosure, cable gland, versions, dimensions in mm (inch)

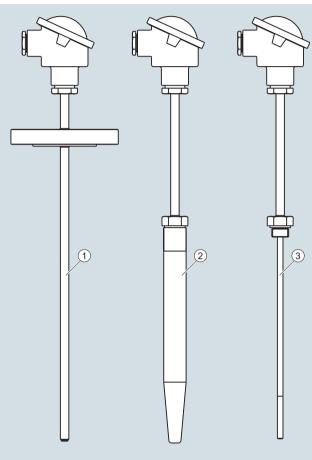
# **Temperature Measurement**

SITRANS TS

#### **Technical description**

#### SITRANS TS500 7MC75xx

The following image illustrates the available designs for SITRANS TS500 temperature sensors:



- 1) SITRANS TS500, tubular thermowell
- 2 SITRANS TS500, tubular thermowell
- (3) SITRANS TS500, for installation in an existing thermowell

SITRANS TS500 temperature sensors; the IP degree of protection depends on the connection head (see page 2/84)

The temperature sensors of the SITRANS TS500 series are available in three different designs:

Version	Description	Application	Process connection
1	Tubular thermowell     Tubular thermowell and extension made of one pipe; closed at the tip with a welded bottom cap	Minimal to medium process load	Welded connection with thread or flange     connection with compression fitting
2	Barstock ther- mowell     Barstock ther- mowell, tubular extension, exten- sion screwed into thermowell	Medium to highest process load	Directly welded into pipeline     With welded flange     With male thread
3	<ul> <li>For installation into existing ther- mowells.</li> <li>Tubular extension</li> </ul>	Process load depends on ther- mowell design	Screwed into existing thermowell

# Function

A complete measuring point consists of a measuring insert which contains the basic sensors, the protective fitting and an optional measurement value processor (transmitter).

The basic sensors are:

- Resistance thermometers: Temperature measurement is based on the temperature dependency of the installed measuring resistor.
- Thermocouples:
   Temperature measurement is based on the Seebeck effect.
   A thermocouple which subjected to a temperature drop produces thermoelectric voltage that can be measured.

#### Transmitters:

The optional Siemens transmitters assume the following functions:

- Optimum measurement processing
- Strengthening of weak sensor signals directly on site
- Transmits standardized signals
- Protects against electromagnetic interfrences
- Support enhanced diagnosis options

The resistance thermometer is intended for installation in containers and pipelines for hygienic requirements.

- Modular design consisting of protective pipe, measuring insert, connection head and optional transmitter for replacement during operation.
- Hygienic version, design according to recommendations of the EHEDG
- Transmitter can be integrated (4 to 20 mA, PROFIBUS PA or FOUNDATION Fieldbus)

# Temperature Measurement SITRANS TS

**Technical description** 

# Configuration

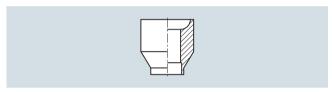
# Components: Process connections

This catalog is limited to the standard versions. Special versions are available on request. The technical data is designed to assist the user. It is the responsibility of the ordering party to make the correct selection of suitable devices.

# Welding

A welded thermowell provides a permanent, secure and highly resilient process connection. This advantage requires an adequate weld-in quality.

It is not possible to accidentally open the process conneciton. Additional gaskets are not required. If the tube is not thick enough to ensure a secure welding connection, the appropriate weldable sockets are used. With weldable sockets of matching length it is also possible to largely stadardize a plant's measuring points. Stocks of spare parts can therefore be reduced to a minimum

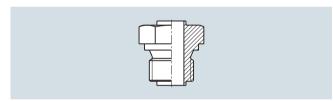


Weldable sockets

#### Thread

# Type of installation: Welded threads

Welded threads of different thread types and sizes are firmly welded to the thermowell.



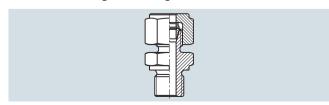
Welded threads

## Type of installation: Compression fittings

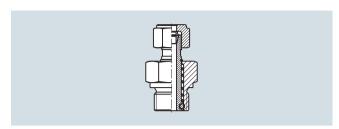
Compression fittings are available as accessories. They fit with the diameter of the thermowell and provide for flexible installation. The mounting length can be selected on site. When installed correctly, compression fittings are well suited for low and medium pressure.

The difference between a normal and spring-loaded design is as follows:

In the case of spring-loaded compression fitting, the sensor is pressed against the measured object or the tip of the thermowell, thus achieving outstanding heat contact.



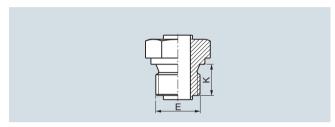
Compression fitting



Spring-loaded compression fitting

# Thread type: Cylindrical thread

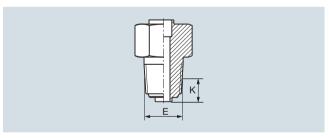
Cylindrical threads do not seal in the thread but due to an additional sealing face or seal. For example, threads with the short form "G" (as per ISO 228) feature a threat type with a defined screw gauge.



Cylindrical thread

#### Thread type: Tapered thread

By contrast, tapered threads, such as the American "NPT" thread, seal metallically in the thread. The relevant length information in the catalog refers to the "fully-tightened point" of the thread, which cannot be defined exactly due to standard-related tolerances. However, the spring unit of the measuring insert compensates for the differences in length.



NPT thread

#### Flanges

The different properties of the flanges are as follows:

- Standard series EN 1092, ASME 16.5,..
- Nominal pressure
- · Nominal diameter
- Sealing face

This information is stamped into the flange, as well as the material code and batch number for "3.1 Material".

#### Industry-specific process connections

Special process connections have become popular in different industries. For example, hygiene technology: clamp connections, milk pipe unions and others.

# **Temperature Measurement**

# SITRANS TS

#### **Technical description**

#### Components: Thermowell

Thermowells fulfill two basic functions:

- They protect the measuring insert from aggressive media
- They make it possible to replace units during ongoing operations

This catalog is limited to the standard versions. Special versions are available on request. The large number of available types can be classified as follows:

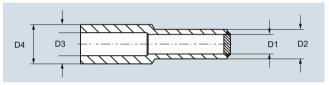
- Tubular thermowells
- Tubular thermowells are also described as "welded" or "multipart" thermowells (not to be confused with "multi-part protective armatures"). They are suitable for low to medium process loads and can be manufactured on a cost-effective basis. Versions:
- Form 2N similar to DIN 43772 with straight tip and shortest possible extension length not adjustable connection head
- Form 2 as per DIN 43772 with straight tip and extension adjustable connection head
- Form 2: with process connection
   Form 2G: Threaded connection
   Form 2F: Flange connection
- Form 3 as per DIN 43772
   Design with tapered tip and extension adjustable connection head
- For these thermowells, thermowell tip is tapered by rotary swaging. This results in an excellent fit with the measuring insert and very good response times.
- Analogous to forms 2, versions 3/3G/3F are also available for form 3
- · Barstock thermowells

Where process loads are too high, or where thermowells with welded seams are not allowed, deep hole drilled barstock thermowells are used. Form 4 thermowells (as per DIN 43772) are very popular in this area. This thermowell type replaces the D1-D5 types of the predecessor standard DIN 43763:

DIN 43763 design	DIN 43772 design 4			
invalid	current			
	L in mm	U in mm		
D1	140	65		
D2	200	125		
D4	200	65		
D5	260	125		

The following table shows the dimensions of the different thermowells.

	Tip		Process connection			
	Ø Inner [mm (inch)]	Ø Outer [mm (inch)]	Ø Inner [mm (inch)]	Ø Outer [mm (inch)]		
Thermowell type, design	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>		
2N/2/2G/2F, tubular	7 (0.28)	9 (0.35)	7 (0.28)	9 (0.35)		
2/2G/2F, tubular	7 (0.28)	12 (0.47)	7 (0.28)	12 (0.47)		
3/3G/3F, tubular	6 (0.24) tolerance acc. to DIN 43772	9 (0.35)	7 (0.28)	12 (0.47)		
4/4F, barstock	7 (0.28)	12,5 (0.49)	7 (0.28)	24 (0.94)		
4/4F, fast response, bar- stock	3.5 (0.14)	9 (0.35)	3.5 (0.14)	18 (0.71)		



Sizing of thermowells

#### Components: Extension (neck tube)

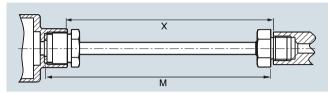
The extension is the section from the lower edge of the connection head to the fixed point of the process connection or thermowell. There is a variety of terms for this components, e.g. neck tube. For this reason the term extension has been selected as a standardized term for the different designs. Function is the deciding factor:

- Thermal decoupling of connection head from process temperature see image page 2/91
- Installation of connection head over existing insulation
- Simple standardization of measuring inserts: In general, the length of the extension may be freely selected. However, when using standardized insertion lengths, the option "Extension as per DIN 43 772" is recommended. This ensures that measuring inserts which are quickly available can be used. In case of special lengths, it is possible to standardize the measuring insert length through a clever combination with the respective special extension length. This allows customers to optimize their costs in purchasing and logistics.
- In the case of American-designed sensors, the extension also takes the spring load of the measuring unit.
- Depending on the design, the extension can also be used to achieve an alignment of the connection head.
- The form of the extension depends on the form of the thermowell:
  - Tubular thermowell
  - The extension and thermowell usually consist of one continuous tube. The process connection is welded on. (= one-piece protective armature).
  - Barstock thermowells
    Extension and thermowell of two components which are

welded together. The process connection is attached to the thermowell (= multi-piece protective armature).

### Technical description

Thermowell type	X [mm (inch)]	M [mm (inch)]	Divisible
2G	129 (5.08)	145 (5.71)	No
2F	64 (2.52)	80 (3.15)	No
3G	131 (5.19)	147 (5.79)	No
3F	66 (2.60)	82 (3.23)	No
4 (only L=110)	139 (5.47)	155 (6.10)	Yes
4 (others)	149 (5.87)	165 (6.50)	Yes



Extensions as per DIN 43772

#### Versions

With regard to their function, extensions can be classified into two types:

- Ajustable/not ajustable: Function on the neck tube to align the connection head to the desired direction
- Integrated measuring insert spring load:
   In the case of American-type sensors, the spring load of the measuring insert is integrated into the extension. Measuring insert and extension form one unit.

inscri and extension	ir form one and.	
European type ajustable, cylindrical	European type ajustable, tapered	wihtout extension wihtout thread (optional gland)
European type not ajustable, cylindrical	European type not ajustable, tapered	European type not ajustable, nipple
		Caring and the second
European type ajustable nipple-union-nipple	American type ajustable, nipple-union-nipple spring load	American type not ajustable nipple-union-nipple spring load

Versions: particularly with heavy stainless steel connection heads in combination with vibration, a short extension length should be selected or external support should be provided.

SITRANS TS

# **Technical description**

# Components: Connection head

Connection head

The connection head protects the connection department.

The connection head features sufficient room for mounting a clamping base or transmitter.

Different connection heads are used depending on the application and preference:

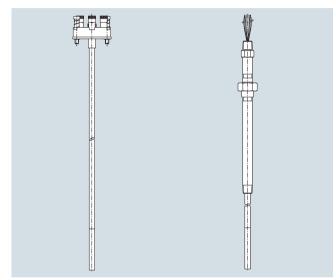
Connection head	Type Material	Designation	Cable gland	Degree of protection	Transmitter installation	Connection height H1 [mm (inch)]	Explosion protection optional
HI	BA0 Aluminum	Flange lid	M20 x 1,5 brass	IP54	Measuring insert	26 (1.02)	Exi
H1 H1	BB0 Aluminum	Hinged cover low	M20 x 1,5 brass	IP65	Measuring insert	26 (1.02)	Exi
H	BC0 Aluminum BP0 Plastic	Hinged cover high	M20 x 1,5 BC0: brass BP0: polyamide	IP65	Measuring insert and/or hinged cover (tandard)	26 (1.02)	Exi
H1	BM0 Plastic	Screw cover	M20 x 1,5 polyamide	IP65	Measuring insert	26 (1.02)	Exi
H1	BS0 Stainless steel	Screw cover	M12 x 1,5 polyamide	IP67	Measuring insert	26 (1.02)	Exi
H1	AG0 Aluminum AU0 Stainless steel AISI 316 (1.4401)	Screw cover, heavy-duty	M20 x 1,5 not Ex: plastic Ex i/Ex n: brass Ex d: without cable gland	IP66/68	Measuring insert	41 (1.61)	Ex i, Ex d
H1 1000 0 8 5 5 6	AH0 Aluminum AV0 Stainless steel AISI 316 (1.4401)	Screw cover, sight glass, heavy-duty, with 4 20 mA display	M20 x 1,5 not Ex: plastic Ex i/Ex n: brass Ex d: without cable gland	IP66/68	Measuring insert	41 (1.61)	Ex i, Ex d

**Technical description** 

#### Components: Measuring insert

#### Measuring insert

The measuring insert of the temperature sensor is built into the protective armature (thermowell, extension and connection head). The sensor element is protected in the measuring insert. The spring load of the Siemens measuring inserts provide good thermal contact with the bottom of the thermowell, and vibration resistance is significantly increased. Only highly resistant mineral-insulated cables (so-called MIC) are used for the electrical connection between the sensor element and connection head. The highly compacted insulation of magnesium oxide achieves excellent level of vibration resistance. The following measuring insert designs are the most widely used on the world market:



European type

American type

## European type

European type measuring inserts can be replaced without having to dismantle the connection head. The springs are located either on the transmitter or the terminal block. This makes it possible to achieve a 8 to 10 mm spring range. If no transmitter is mounted, there is a ceramic base in its place. However, with the order option G01, a version with free wire ends instead of a ceramic base can be selected for mounting head-mounted transmitters.

#### American type

American-type measuring inserts feature a large spring range. These measuring inserts are ideal for use with NPT threads with the typical loose tolerances. In this configuration, the extension function is partially or fully integrated (nipple-union-nipple). Moreover it is also possible to directly attach field devices, e.g. SITRANS TF.

#### Components: Transmitters

SITRANS TH head transmitters process the weak non-linear sensor signals and transmit a stable and temperature-linear standard signal, thereby minimizing sensor signal disruptions.

The transmitters permanently monitor the temperature sensors and transmit diagnostic data to superordinate systems.

Because of the low energy feed of the SITRANS TH head transmitters, self-heating of the temperature sensors can be maintained at minimal levels.

The electrical isolation and integrated cold junction ensure that temperature sensors with thermocouples provide reliable measurements at a low cost.

#### SITRANS TH product family

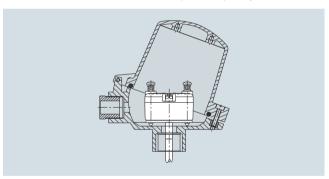
For detailed technical data on the SITRANS TH transmitters, please refer to the catalog FI 01.

- TH100 the basic device
  - Output 4 to 20mA
  - for Pt100
  - can be configured using simple software
- TH200 the universal device
  - Output 4 to 20mA
  - Resistance thermometer, thermocouples
- can be configured using simple software
- TH300 HART universal
  - Output 4 to 20 mA/HART
- Resistance thermometer, thermocouples
- HART conforming
- Diagnostic functions
- TH400 Fieldbus PA and FF
  - Output PROFIBUS PA or FOUNDATION Fieldbus
  - Resistance thermometer, thermocouples
  - Diagnostic functions; for detailed technical description of the SITRANS TH transmitter please refer to the related chapter of this catalog.

#### Installation types

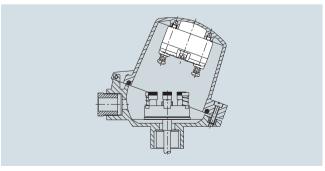
All SITRANS TH transmitters can be installed in type B connection heads. The following installation forms are used:

- Measuring insert installation
  - Our standard version offers the following advantages
  - Small vibrating masses and compact design
  - Insert-transmitter unit can be replaced quickly



Installation of measuring insert

- · Hinged cover installation
  - Standard for head type BC0 and BP0
  - Advantage: Measuring insert and transmitter can be repaired/maintained separately (recalibration).



Hinged cover installation

#### SITRANS TS

#### **Technical description**

#### Measuring technology: Sensor elements

The diverse application spectrum for industrial temperature measuring technology requires different sensor technologies.

#### Resistance thermometer

Sensor elements made of other basic materials with different nominal resistances or different underlying standards are available on request. Resistance thermometers can be classified as follows:

- Basic design:
- The sensor element is built with thin layer technology. The resistance material is applied in the form of a thin layer on a ceramic carrier material.
- Versions featuring increased vibration-resistance: In addition to the basic design, the vibration resistance is improved through extra measures.
- Versions with expanded measuring range: Elements in wire-wound design. The wire winding is embedded in a ceramic body.

#### Thermocouples

Other thermocouples based on other thermo couples or underlying standards are available upon request.

The most common base metal thermocouples include:

- Type N (NiCrSi-NiSi) high degree of stability even in upper temperature range.
- Type K (NiCr-Ni) more stable than type J, but drifts in upper range.
- Type J (Fe-CuNi) narrow application band

#### Measuring technology: Measuring range

The measuring range describes the temperature limits within which the thermometer can be used in a way that is meaningful for measurement purposes. Depending on the loads present, the thermowell materials and the desired accuracy levels, the actual application range for the thermometer may be smaller.

Resistance thermometer [°C (°F)]		
Basic version and increased vibration resistance	-50 +400 (-58 +752)	
Expanded measuring range	-196 +600 (-320.8 +1112)	
Thermocouple [°C (°F)]		
Type N	-40 +1100 (-40 +2112)	
Туре К	-40 +1000 (-40 +1132)	
Type J	-40 +750 (-40 +1382)	

#### Measuring technology: Measuring accuracy

#### Resistance thermometer

The tolerance classes of the resistance thermometers correspond with IEC 751/EN 60751:

Tolerance	Δt
Basic accuracy, Class B	±(0.30 °C +0.0050 t[°C] ) ±(0.54 °F +0.0050 t [°F]-32 )
Increased accuracy, Class A	±(0.15 °C +0.0020 t[°C] ) (±(0.27 °F +0.0020 t [°F]-32 ))
High degree of accuracy, Class AA (1/3 B)	±(0.10 °C +0.0017 t[°C] ) (±(0.18 °F +0.0017 t [°F]-32 ))

The following tables provide an overview of the scope of these tolerances. If you exceed the specified limits with a resistance thermometer, the values of the next lower accuracy class apply:

Resistance thermometer Basic version [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-50 +400 (-58 +752)
Increased accuracy, Class A	-30 +300 (-22 +572)
High degree of accuracy Class AA (1/3 B)	0 150 (32 302)

Resistance thermometer Increased vibration-resistance [°C (°F)]		
Tolerance	Range	
Basic accuracy, Class B	-50 +400 (-58 +752)	
Increased accuracy, Class A	-30 +300 (-22 +572)	
High degree of accuracy Class AA (1/3 B)	0 150 (32 302)	

Resistance thermometer Expanded measuring range [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-196 +600 (-321 +1112)
Increased accuracy, Class A	-100 +450 (-148 +842)
High degree of accuracy Class AA	-50 +250 (-58 +482)

### Thermocouples

The tolerance classes of the thermocouples correspond with IEC 584/EN 60584:

## Catalog versions

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
N	-40 °C +333 °C ±2.5 °C (-40 °F +631 °F ±4.5 °F) 333 °C 1100 °C ±0.0075x t[°C]  (631 °F 2012 °F ±0.0075x t[°F]-32 )	-40 °C +375 °C ±1.5 °C (-40 °F +707 °F ±2.7 °F) 375 °C 1000 °C ±0.004x t[°C]  (707 °F 1832 °F ±0.004x t[°F]-32 )
K	$ \begin{array}{l} -40\ ^{\circ}C\\ +333\ ^{\circ}C\ \pm 2.5\ ^{\circ}C\ (-40\ ^{\circ}F\\ +631\ ^{\circ}F\ \pm 4.5\ ^{\circ}F) \\ 333\ ^{\circ}C\\ 1000\ ^{\circ}C\ \pm 0.0075x t[^{\circ}C] \ (631\ ^{\circ}F\\ 1832\ ^{\circ}F\ \pm 0.0075x t[^{\circ}F]-32 ) \end{array}$	-40 °C +375 °C ±1.5 °C (-40 °F +707 °F ±2.7 °F) 375 °C 1000 °C ±0.004x t[°C]  (707 °F 1832 °F ±0.004x t[°F]-32 )
J	-40 °C +333 °C ±2.5 °C (-40 °F +631 °F ±4.5 °F) 333 °C 750 °C ±0.0075x t[°C]  (631 °F 1382 °F ±0.0075x t[°F]-32 )	-40 °C +375 °C ±1.5 °C (-40 °F +707 °F ±2.7 °F) 375 °C 750 °C ±0.004x t[°C]] (707 °F 1382 °F ±0.004x t[°F]-32 )

Technical description

#### Other thermocouples, ignoble

Туре	Basic accuracy, Class 2	Increased accuracy, Class 1
T		-40 °C +125 °C ±0.5 °C (-40 °F +257 °F ±0.9 °F) 125 °C 350 °C ±0.004x t[°C]  (257 °F 662 °F ±0.004x t[°F]-32 )
E	-40 °C +333 °C ±2.5 °C (-40 °F +631 °F ±4.5 °F) 333 °C 900 °C ±0.0075x t[°C]  (631 °F 1652 °F ±0.0075x t[°F]-32 )	-40 °C +375 °C ±1.5 °C (-40 °F +707 °F ±2.7 °F) 375 °C 800 °C ±0.004x t[°C]] (707 °F 1472 °F ±0.004x t[°F]-32 )

#### Other thermocouples. noble

Туре	Basic accuracy, Class 2	Increased accuracy. Class 1
R and S	0 °C 600 °C±1.5 °C (32 °F 1112 °F±2.7 °F) 600 °C 1600 °C±0.0025 x  t  (1112 °F 2912 °F±0.0025 x  t )	0 °C 1100 °C±1 °C (32 °F 2012 °F±1.8 °F) 1100 °C 1600 °C±[1 + 0.003 (t - 1100)] °C (2112 °F 2912 °F±[1.8 + 0.003 (t - 212)] °F)
В	600 °C 1700 °C±0.0025 ×  t  (1112 °F 3092 °F±0.0025 ×  t )	

SITRANS TS300 Clamp-on			
Measuring accuracy			
Reference conditions			
• Pipeline	13 x 1.5 mm (0.51 x 0.06 inch) made of stainless steel using using thermal paste		
Ambient temperature	20 °C (68 °F)		
• Medium	Water, 120 °C (248 °F)		
• Flow speed	3 m/s (9.84 ft/s)		
Measuring accuracy using thermal paste (The accuracy depends on the geometry of the pipeline, the medium and the ambient conditions. $T_{M} = \text{process temperature}; \\ T_{A} = \text{ambient temperature})$	Process-optimized for steam sterilization		
• Application, process-optimized for steam sterilization	for 100 150 °C (212 302 °F (T <sub>A</sub> -T <sub>M</sub> ) x 0.01		
<ul> <li>Application, alternative class A as per IEC 60751</li> </ul>	-40 +150 °C (-40 302 °F) (T <sub>A</sub> -T <sub>M</sub> ) × 0.02		

### Measuring technology: Response times

Response time describes the speed of the measurement system in the case of a temperature change, and is typically indicated as T0.5 or T0.9. The values indicate the time in which a measured value has increased to 50% or 90% of the actual temperature increase.

The main variables which affect response time are as follows:

- Ideal thermowell geometry includes:
  - smallest possible material at the tip
  - use of conductive material
- Thermal connection of measuring insert to thermowell: Due to the optimized design of the Siemens inserts (small gap width, spring system), they feature very good response behavior. Because of the good fit, additional contact materials are not usually required except in certain applications e.g. attachment of a surface sensor.
- Size of temperature increase
- Medium and flow rate

#### Resistance thermometer

Typical values as per EN 60751 in water at 0.4m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	6	15
Straight (2)	9 (0.35)	34	90
	12 (0.47)	45	143
Tapered (3)	12 (0.47)	15	31
Barstock (4) U=65	24 (0.95)	40	100
Barstock (4)] U=125	24 (0.95)	45	110

### Thermocouples

Typical values as per EN 60751 in water at 0.4m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	2	4
Straight (2)	9 (0.35)	20	63
	12 (0.47)	19	66
Tapered (3)	12 (0.47)	7	22
Barstock (4) U=65	24 (0.95)	22	73
Barstock (4)] U=125	24 (0.95)	20	53

#### SITRANS TS

#### **Technical description**

#### Measuring technology: Mounting depth

#### Measuring insert

Туре	Temperature-sensitive length (TSL [mm (inch)]	Non-bendable length [mm (inch)]
Basic	50 (1.97)	30 (1.82)
Increased vibration resistance	50 (1.97)	30 (1.82)
Expanded measuring range	50 (1.97)	60 (2.36)
Thermocouple	20 (0.79)	5 (0.20)

#### Immersion depth/contact with media

Ambient conditions (temperature/climate/insulation) and the design of the thermowell, process connection and piping result in so-called "heat transmission errors".

To prevent such an error, the submersion depth and diameter of the thermowell tip will be defined. The temperature-sensitive length (TSL) of the thermowell must also be taken into account. The following rule of thumb can be used:

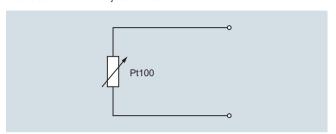
- Wate
  - Submersion depth  $\geq$  TSL + 5 x Ø of thermowell
- Air
  - Submersion depth  $\geq$  TSL + 10 ... 15 x Ø of thermowell
- Recommendations
  - Select largest possible submersion depth
  - Select measuring location with higher flow velocity
  - Thermal insulation for outer thermometer components
  - Smallest possible surface for outer components
  - Insertion in pipe bends
  - Direct measurements without additional thermowell if no suitable solution can be found using other measures.

#### Measuring technology: Connection types

In the case of resistance thermometers, the type of sensor connection directly affects the level of accuracy:

#### Two-wire system

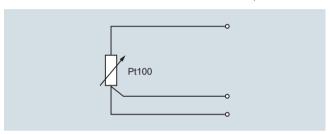
The resistance of sensor lines are included in the measurement result as an error. Adjustments are recommended in this case.



Pt100 Two-wire system

#### Three-wire system

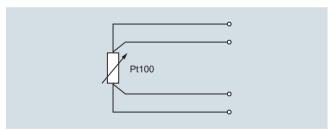
Line resistance is not included in the measurement result. Requirements: all terminal and line resistances (corrosion) are at the same level, and terminals are at the same temperature level.



Pt100 Three-wire system

#### Four-wire system

Line resistance is not included in the measurement result. This type of connection is the most secure and most accurate.



Pt100 Four-wire system

Siemens measuring inserts can be used to implement all types of connections for 1 x Pt100 devices. In the case of 2 x Pt100 versions, two- and three-wire systems are also possible. For measurement-related reasons, we always recommend a 1 x four-wire or 2 x 3-wire connection.

Technical description

#### Temperature influence

At the connection head TS5001)

	Without transmitter [°C (°F)]	With transmitter [°C (°F)]
Aluminum or stainless steel	-40 +100 (-40 +212)	-40 +85 (-40 +185)
Plastic	-40 +85 (-40 +185)	-40 +85 (-40 +185)

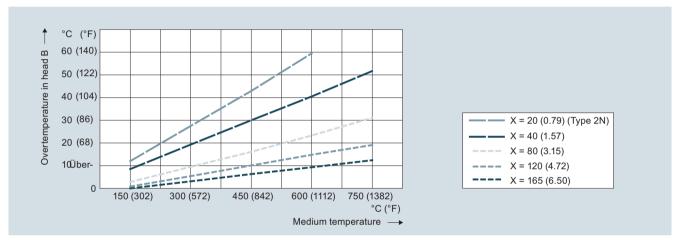
<sup>1)</sup> Notice manual at Ex-applications, please

#### At the TS100/200 connector/cable connection point:

The specified measuring range is valid for the hot end of the sensor. At the cold end, the maximum permitted temperature depends on the cables and plugs used.  $< 80 \, ^{\circ}\text{C}$  (176  $^{\circ}\text{F}$ ) is uncritical for all types

#### Influence of extension

The illustration below assists you in selecting the right length for the neck tube. In this case, the following applies: Connection head temperature = Ambient temperature + Overtemperature. The temperature in the connection head can thus be assessed as follows:



Extension length X, effect on temperature, dimensions in mm (inch)

Please note that guidance values may change due to local conditions. Please consider these potential changes particularly with respect to explosion protection.

Also note that the accuracy of the transmitter also depends on the temperature in the connection head.

### SITRANS TS

#### **Technical description**

#### SITRANS TS300 Clamp-on

#### Design

Measuring insert

- Special measuring insert made of stainless steel; hygienic design
- Measuring element made of silver, thermal decoupling through plastic insert

Measuring insert screwed into collar with spring load. Use heat-conductive-compound (see accessories) prior to mounting the device.

#### Pipe collar

Material

Temperature resistant high-performance plastic with integrated insulating system in the hygienic design

• Ambient temperature influence

Approx. 0.2 %/10 K

#### Process connection/Thermowell

When selecting a process connection, the process parameters sometimes only allow a specific technology. In addition, regional standard-related and customer-specific requirements must be abserved. The range of products therefore includes a broad selection of standard connections.

In the case of redesigned or newly designed facilities, it is possible to achieve cost savings by implementing various measures:

- Use of standard lengths through clever selection of screw, weld or flange sockets
- Moveable compression fittings

The temperature resistance of a material for process connections and thermowells also limits the application area of the temperature sensor. The temperature range indicated on the type plate always refers to the measuring insert, not the material which comes into contact with media. Two aspects must be considered when assessing temperature stability:

- What maximum temperature may the material reach without a load?
- What is the behavior under load?

#### Process load

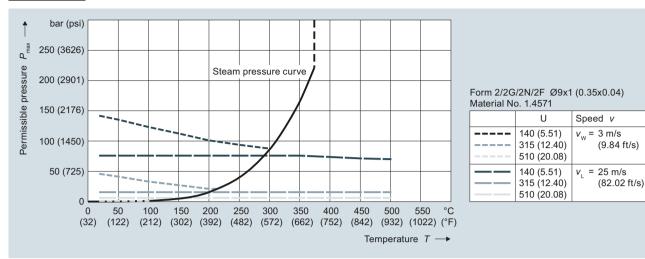
Because of the large variety of possible applications and variables, it is not possible to make general binding statements regarding the resilience of components which comes into contact with media. The load diagrams below can be used for common applications. However, where operating conditions vary significantly, please contact our technical support team.

Load on the thermowell and remedies:

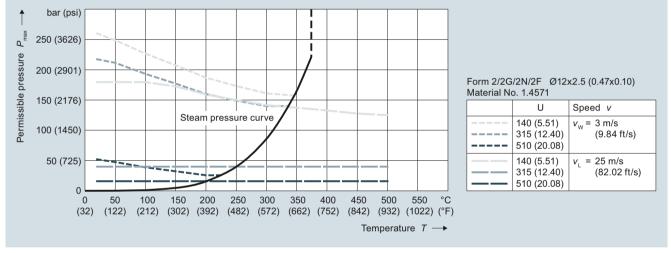
The process itself	Correction options
Temperature	Material selection
Pressure	Thermowell type
Flow velocity	Insertion length, thermowell type
Viscosity	Insertion length, thermowell type
Vibration	Support against vibration
Corrosiveness	Material selection, coating
Abrasion (e.g. carbon dust)	Sensing rod, coating

**Technical description** 

### Load diagrams



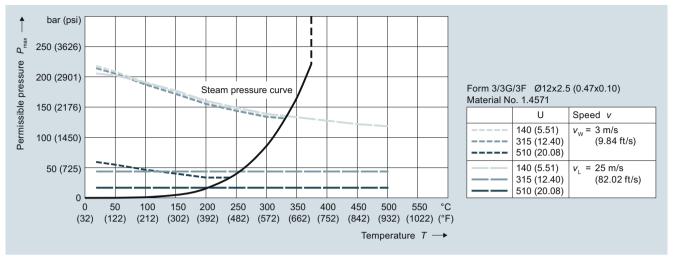
Thermowells with  $\emptyset$  9 x 1 mm (0.35 x 0.04 inch), dimensions in mm (inch)



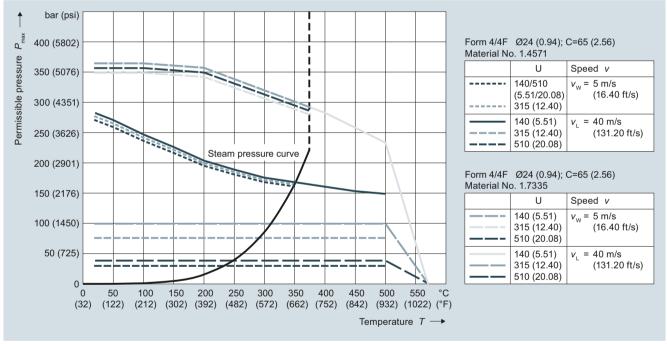
Thermowells with Ø 12 x 2.5 mm (0.47 x 0.10 inch), dimensions in mm (inch)

SITRANS TS

#### **Technical description**

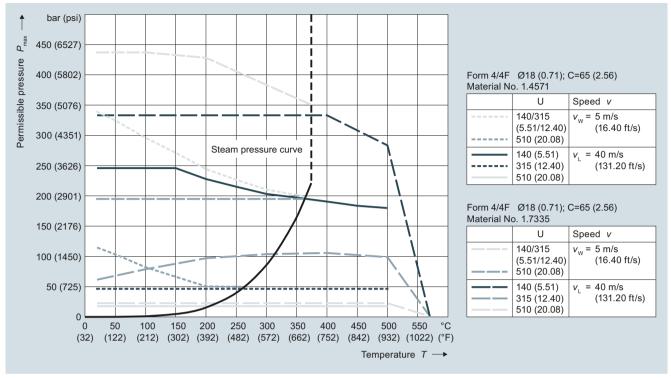


Thermowells with Ø 12 x 2.5 mm (0.47 x 0.10 inch), Ø 14 x 2.5 mm (0.55 x 0.10 inch), dimensions in mm (inch)

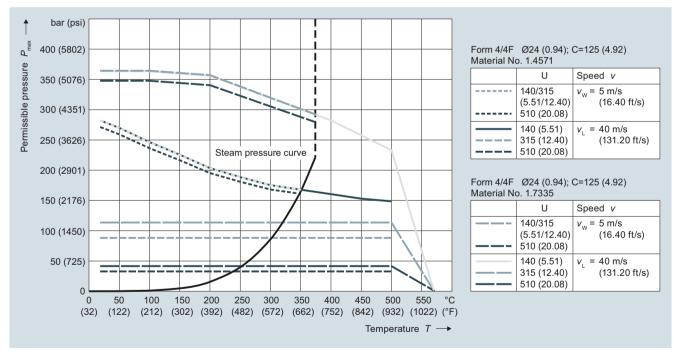


Thermowells with Ø 24 mm (0.95 inch), C= 65 mm (2.60 inch), dimensions in mm (inch)

#### Technical description



Thermowells with Ø 18 mm (0.71 in), C= 65 mm (2.60 inch), dimensions in mm (inch)



Thermowells with Ø 24 mm (0.95 inch), C= 125 in (4.92 in), dimensions in mm (inch)

# **Technical description**

#### Thermowell calculation

Properly applied load diagrams will provide a sufficient degree of safety for the most common thermowell configurations.

However, there are cases in which operating conditions deviate too greatly from standard parameters. In this case, a customized thermowell calculation may be required.

Another reason for doing this calculation is the fact that flowing media can create turbulence at the tip of the thermowell under certain conditions. The thermowell will then vibrate and may even be destroyed if not configured correctly. This is the most frequent cause of thermowell bailure.

SIEMENS offers the two recognized methods for calculating the thermowell:

- DIN/Dittrich method
- ASME/Murdock method This method also takes into account turbulence formation on a mathematical level.

Both methods provide a high degree of safety with regard to thermowell configuration, however, they do not provide a guarantee against breakdowns.

#### Materials

Material c	Material descriptions/Standards comparison				Properties	Applications
Mat. No.:	AISI/Trade name:	EN 10028-2:	Description			
1.4404 or 1.4435	AISI 316 L	X2CrNiMo17-12-2	Austenitic stain- less steel	600 (1112)	Good acid resistance, resistant against grain boundary corrosion	Chemical industry, waste treat- ment, paper and cellulose industry, food industry
1.4571	AISI 316 Ti	X6CrNiMoTi 17 12-2	Austenitic stain- less steel	800 (1472)	Good acid resistance, resistant against grain boundary corro- sion (supported by TI portion)	Chemical industry, textile industry, paper and cellulose industry, water supply, food and pharmaceuticals
1.5415	A 204 size A	16Mo3	Carbon steel, high-alloy	500 (932)	Resistant at higher tempera- tures, well suited for welding	Steam turbines, steam lines, water pipes
1.7335	A 182 F11	13CrMo4-5	Carbon steel, high-alloy	540 (1004)	Resistant at higher tempera- tures, well suited for welding	Steam turbines, steam lines, water pipes
1.4841	SS 314	X15CrNiSi25-20	Austenitic heat- resistant stain- less steel	1150 (2102)	Resistant at high temperatures, also resistant against low-O <sub>2</sub> and nitrogen-containing gases.	Flue gas, petrochemical industry, chemicals industry, power plants
1.4762	446	X10CrAl24	Ferritic heat- resistant steel	1150 (2102)	Resistant at high tempera- tures, in oxidizing and reduc- ing sulphur-containing atmosphere	Chemical industry, power plants, steel industry, waste gas treatment
2.4816	Inconel 600	NiCr15Fe	Nickel-Chrome alloy	1150 (2102)	Resistant at high tempera- tures, resistant against chlo- rine-induced cold crack corrosion	Chemical industry, petrochemical industry, food industry
1.4876	Incoloy 800	X10NiCrAlTi32-21	Austenitic heat- resistant stain- less steel	1100 (2012)	Excellent resistance against oxidation and carbonization at high temperatures, good corrosion resistance	O&G industry, waste gas treat- ment, power plants (steam boiler, heat exchanger), appli- cations using aggressive fluids
2.4819	Hastelloy C 276	NiMo16Cr15W	Nickel-Chrome- Molybdenum alloy	1100 (2012)	Resistant at high tempera- tures, in oxidizing and reduc- ing atmosphere, resistant against pitting and crevice cor- rosion, good corrosion resis- tance after welding	Chemicals industry, paper and cellulose industry, waste treatment, waste incinerators, emissions controls, shipbuilding and offshore industry
2.4360	Monel 400	NiCu30Fe	Nickel-Copper alloy	500 (932)	Excellent corrosion resistance, particularly against chlorine-induced cold crack corrosion	Chemical industry, offshore industry, nuclear technology, petrochemical industry

Where cost-intensive materials are used with flange thermowells, cost savings can be achieved by using a so-called flanged wheel. A thin disc of the material which comes into contact with media is applied prior to the flange (ordinary stainless steel).

Materials sensor tube/measuring inserts:

- SITRANS TSinsert, TS100, TS200
  - Resistance thermometer Cr-Ni-Mo
  - Thermocouples 2.4816/Inconel600

**Technical description** 

#### Vibration resistance of measuring insert, cable sensor

Similar to the thermowell, inner (Karman vortices) and outer (plant) vibrations also affect the measuring insert. For this reason, a special assembly of measurement elements is required. Other than a few exceptions for cable and compact thermometers. Siemens only produces sensors based on a mineral-insulated cable. Together with precautions taken when installing the measuring element, the Siemens basic version already exceeds EN 60751 by more than a factor of 3. Pursuant to the measurement methods of this standard, the following values are obtained (tip-tip):

- 10 g: Basic version and expanded measuring range
- 60 g: Increased vibration-resistance and thermocouple

#### Bending ability of measuring insert/cable sensor

All Siemens measuring inserts SITRANS TSinsert are made with a mineral-insulated cable (MIC). The same applies to a portion of the cable and compact thermometer. In addition to the properties already described, another advantage of the MIC is its bending ability. This makes it possible to install these thermometers even in difficult to access areas. Please ensure that you are not below the following bending radius:

Ø MIC [mm (inch)]	R <sub>min</sub> = 4x Ø MIC [mm (inch)]
3 (0.12)	12 (0.48)
6 (0.24)	24 (0.95)

Where a smaller bending radius is required due to installation conditions, subsequent testing of the insulation resistance is recom-

#### Electrical stability

#### Insulation resistance

The insulation resistance between each measuring circuit and the fitting is tested at a voltage of 500 V DC at room temperature.

#### $R_{iso} \ge 100 M\Omega$

Due to the property of the mineral-insulated cable, the insulation resistance decreases as temperature increases. Because of the special production method, it is, however, possible to achieve very good values even at high temperatures.

#### Line resistance

When connected to two-wire systems, the line resistance is included in the measurement result. The following rule of thumb can be used:

- $\varnothing$  Measuring insert 3 mm (0.12 inch) 5  $\Omega$ /m or 12.8 °C (55.04 °F)
- Ø Measuring insert 6 mm (0.24 in) 2.8 Ω/m or 44.78 (44.78)

For this reason a connection to three- or four-wire systems is highly recommended.

#### Pressure equipment directive:

This device is not included in the pressure device guideline; classification according to pressure device guideline (PED 97/23/EC), Directive 1/40; article 1, paragraph 2.1.4

In addition, statutory, standards-based or operating specifications also require additional testing. The results are certified in certificates as per ÉN 10204:

- As per EN 10204-2.1, order conformity (C35) Certificate in which Siemens confirms that the delivered products correspond with the requirements of the order, without indicating test results. The testing does not have to be carried out on the delivered devices
- As per EN 10 204-3.1

Certificate in which Siemens confirms that the delivered products meet the requirements set out in the order, with indication of the specific test results. Testing is carried out by an organization which is independent of production. The inspection certificate 3.1 replaces 3.1.B of the previous edition.

Material certificate for parts which come into contact with media (C12)
This certificate confirms the properties of the material and war-

rants traceability up to the melting batch.

Pressure-resistant (C31)

Hydrostatic pressure test on thermowell as per customer specifications. Where operating pressure is not specified, testing is carried out using the nominal pressure of the process connection.

Helium leak test (C32)

This test can be used to detect even the smallest leaks in thermowells and welded seams.

Dye penetration test (C33)

The dye penetration method can detect cracks and other surface defects

Comparative test (calibration) (Y33)

The test object is measured in at an equalized temperature level against a highly precise thermometer, and the measured values of test object and normal values are documented. However, calibration requires the measuring insert to be of a certain minimum length.

Measuring inserts can be calibrated together with the associated transmitter. Calibration values can be stored in the transmitter in order to increase the accuracy of the system.

As per EN 10204-3.2

This acceptance certificate can be prepared on request, together with an acceptance representative of the ordering party or a representative indicated as per official requirements (e.g. TÜV) It confirms that the delivered products meet the requirements set out in the order; it also contains the test results.

#### Approvals

Explosion protection according to ATEX and IECEx-

Designator	Addition	Type of protection	Ex-identifier	For zone
TSinsert	E01	Intrinsic safety "ia", "ic	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4T1 Ga II 3 G Ex ic IIC T6/T4T1 Gc	20 0 2
	E02	-		
	E03	for SITRANS TS500 with protection type Ex d		
	E04	-		
TS100	E01	Intrinsic safety "ia", "ic	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4T1 Ga II 3 G Ex ic IIC T6/T4T1 Gc	20 0 2
	E02, E03, E04	-		
TS200	E01	Intrinsic safety "ia", "ic	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4T1 Ga II 3 G Ex ic IIC T6/T4T1 Gc	20 0 2
	E02, E03, E04	-		
TS500	E01	Intrinsic safety "ia", "ic	II 1/2 D Ex ia/ib IIIC T200 °C Da/Db II 1/2 G Ex ia/ib IIC T6/T4T1 Ga/Gb II 3 G Ex ic IIC T6/T4T1 Gc	20*/21 0*/1 2
	E02	-		
	E03	Flameproof enclosure "d" Dust protection by enclosure "t" only in combination with connection heads code AG0, AH0, AU0, AV0, without cable gland	II 1/2 G Ex d IIC T6, T4, T3 Ga/Gb II 1/2 D Ex tb IIIC T85 °C, T100 °C, T150 °C Da/Db	0*/1 20*/21
	E04	Non-sparking "n"	II 3 G Ex nA IIC T6/T4T1 Gc	2

<sup>\*</sup> Up to process connection

SITRANS TS

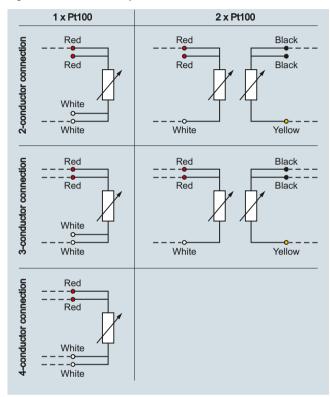
#### **Technical description**

#### **Schematics**

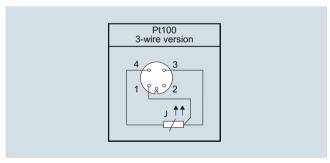
#### Resistance thermometer

SITRANS TSinsert measuring inserts are designed as a four-wire system for single Pt100 if not mentioned differently. This makes it possible to implement all of the aforementioned connection types.

Double Pt100 measuring inserts (for 6 mm OD only) are designed as a three-wire system.

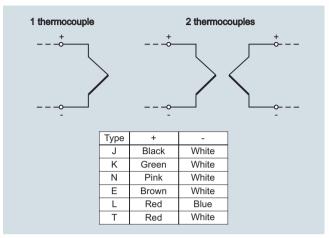


Schematics 1 x Pt100-2W up to 2 x Pt100-4W



Connection diagram for round connector M12 x 1, 4-pole

#### Thermocouples



Circuit diagram for thermocouple

Where thermocouples are used, the use of head transmitters offers particular advantages: The cold junction is already integrated into the universal transmitter. There is no need for expensive thermo or extension cable. This also removes a number of possible error sources. The weak millivolt signal of the thermocouple is already converted into a stable and temperature-linear DC or bus signal on site. This drastically reduces the effects of electromagnetic factors on the measurement result.

If a head transmitter is not installed, the sensor feed line consists either of the appropriate thermo or extension leads. The thermo line is made from the thermo material of the relevant thermocouple, while the extension lead uses a cost-effective substitute material. The extension cable behaves similar to a thermo line at an electrical level, within a limited temperature range of up to  $200^{\circ}\mathrm{C}$ .

A wide spectrum of color coding is available for thermocouples on an international level. This must be taken into account during the electrical connecting.

### Technical description

Coun try	International/ Germany			North America		UK/ Czech Republic			
Stan- dard	Not int safe <sup>1)</sup>	rinsical	ly	Extens	ion lead	d <sup>2)</sup>	BS 184	43	
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	PN	PN	WH	OG	OG	RD	OG	OG	BU
K	GN	GN	WH	YE	YE	RD	RD	BR	BU
J	BK	BK	WH	BK	WH	RD	BK	YE	BU
Т	BR	BR	WH	BU	BU	RD	BU	WH	BU
Е	VT	VT	WH	VT	VT	RD	BR	BR	BU
R+S	OG	OG	WH		BK	RD	GN	WH	BU
В	GY	GY	WH	GY	GY	RD	-	-	-

<sup>1)</sup> With an intrinsically safe line as per IEC 584-3, the sheath is always blue.

<sup>&</sup>lt;sup>2)</sup> For thermo lines as per ANSI MC96, the sheath is always blue.

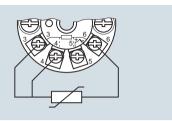
							•		
Coun try	Nethe	rlands		Japan			France	е	
Stan- dard	DIN 43	3714		ISC 16	10-198		NF C4	2-323	
	Jacket	+	-	Jacket	+	-	Jacket	+	-
Ν	GN	RD	GN	BU	RD	WH	VT	VT	YE
K	BU	RD	BU	YE	RD	WH	BK	BK	YE
J	BR	RD	BR	BR	RD	WH	BU	BU	YE
T	BK	RD	BK	VT	RD	WH	OG	OG	YE
E	WH	RD	WH	BK	RD	WH	GN	GN	YE
R+S	GY	RD	GY	GY	RD	WH	-	-	-
В	GN	RD	GN	BU	RD	WH	VT	VT	YE

Abbreviation for colors						
BK: black	BR: brown	BU: blue	GD: gold	GN: green		
GY: gray	OG: orange	PN: pink	RD: red	SR: silver		
TQ: tur- quoise	VT: violet	WH: white	YE: yellow			

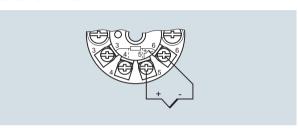
### Transmitters

Where SITRANS TH transmitters are used in the connection head of the temperature sensor, connection takes place according to the following pattern

# SITRANS TH100/TH200/TH300

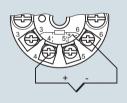


Resistance thermometer

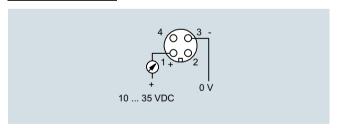


Thermocouples

#### SITRANS TH400



## SITRANS TH100SLIM



In addition, our transmitters also allow for a large number of other possible connections (e.g. difference, average, two sensors). More information can be obtained at:

http://www.siemens.com/temperature

# SITRANS TS

Туре	TSinsert	TS100	TS200
Description	Measuring insert	Temperature sensors in cable version	Temperature sensors in compact version
Application	Replaceable	Universal use	Universal use
Version	Mineral-insulated version	Mineral-insulated version	Mineral-insulated version
Туре	in European or American type	For unfavorable space conditions	For unfavorable space conditions
Image			
Catalog page	2/90	2/38	2/42
Order	Nr. 7MC70*	7MC711*	7MC72*
Wetted mate- rial	Cr-Ni-Mo (RTD): 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)
Thermowell types	To order separately	Without/with separate thermowell	Without/with separate thermowell
Process connections	-	Compression fittings  • Soldering nipple: - G 1/4, G 1/2 - 1/2 NPT - M 8x1, M18x1.5  • Surface connection piece for installation on surfaces/tubes	Compression fittings  • Soldering nipple: - G ¼, G ½ - ½ NPT - M 8x1, M18x1.5  • Surface connection piece for installation on surfaces/tubes
Sensor ele- ments	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor con- nection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	Class AA Class A Class B Class 1 Class 2	Class AA Class A Class B Class 1 Class 2	Class AA Class A Class B Class 1 Class 2
Connection heads	Type B (Type A flameproof)	Cable, optional with misc. plugs	flying leads     misc. plugs
Explosion protection, (ATEX IECEx)	Intrinsic safety "ia", "ic" for TS500 in Ex d + Ex tb	Intrinsic safety "ia", "ic"	Intrinsic safety "ia", "ic"
Output signal	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal	Sensor signal
Application	Spare parts	<ul><li>Machinery and equipment</li><li>Bearing temperature</li><li>Surfaces</li></ul>	<ul><li>Machinery and equipment</li><li>Bearing temperature</li><li>Surfaces</li></ul>
Limit temperat. <sup>1)</sup> [°C (°F)]	Pt100 basis: -50 +400 (-58 +752)  Pt100 ext. measuring range: -196 +600 (-321 +1112)  Thermocouple: -40 +1100 (-40 +2012) (depends on type)	<ul> <li>Pt100 basis: -50 +400 (-58 +752)</li> <li>Pt100 ext. measuring range: -196 +600 (-321 +1112)</li> <li>Thermocouple: -40 +1100 (-40 +2012) (depends on type)</li> </ul>	Pt100 basis: -50 +400 (-58 +752)  Pt100 ext. measuring range: -196 +600 (-321 +1112)  Thermocouple: -40 +1100 (-40 +2012) (depends on type)
Max. nominal pressure <sup>1)</sup> (static pres- sure at 20°C)	-	Compression fitting max. 5 bar (145 psi)	Compression fitting max. 5 bar (145 psi)
Min. response time t <sub>0.5</sub>	2 6 s	2 6 s	2 6 s
Degree of protection	IP54	See drawing page 2/7	See drawing page 2/7

<sup>1)</sup> Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowel-materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

Туре	TS300 Modular	TS300 Clamp-on
Description	Temperature sensors for food, pharmaceuticals and biotechnology	Temperature sensors for food, pharmaceuticals and biotechnology
Application	Measurements submersed in medium (pipelines and vessels)	Clamp-on measurement of pipe surface temperature
Version	Protective pipe similar to DIN 43772, Type 2F and tapered design	Protective pipe similar to DIN 43772, Type 2F and tapered design
Туре		For unfavorable space conditions
Image		Carrier Constitution of the Constitution of th
Catalog page	2/46	2/50
Order	7MC8005*	7MC8016
Wetted material	1.4404 or1.4435 (316L)	1.4404 or 1.4435 (316L)
Thermowell types	Similar to 2F	Similar to 2F
Process connections	DIN 11851, clamp connection (Triclamp/ISO 2852/DIN 32676), Varivent, Ingold connection (Fermenter connection), Neumo Biocontrol, ball weld sleeve, (gaskets are not included in scope of delivery)	Clamp-on connections suitable for the following pipe diameters:  • Collar 4 57 mm (0.16 2.24 inch)  • Tensioning 6 50,8 mm (0.24 2.00 inch)  • Tensioning 50 200 mm (1.97 7.87 inch)
Sensor elements	Pt100	Pt100
Sensor connection	• 1x4 wire • 2x3 wire	• 1x3 wire
Sensor accuracy	• Class A	Class A     Process-optimized design
Connection heads	Тур В	• Typ B
Explosion protection, (ATEX IECEx)	•	-
Output signal	Sensor signal:  • 4 20 mA (TH100/TH200)  • HART (TH300)  • PA (TH400)  • FF (TH400)	Sensor signal:  • 4 20 mA TH100slim  • HART (TH300)  • PA (TH400)  • FF (TH400)
Application	Surface roughness: Standard applications Ra < 1.5 μm (5.9 10 <sup>-5</sup> inch)	Surface roughness: Standard applications Ra < 1.5 µm (5.9 10 <sup>-5</sup> inch)
Limit temperat. 1) [°C (°F)]	-20 +400 °C (-4 +752 °F)	-40 +150 °C (-40 +302 °F)
Max. nominal pressure <sup>1)</sup> (static pressure at 20°C)	0 150 (0 5.91) 50 bar 150 300 (5.91 11.81) 40 bar	No pressure load due to clamp-on principle
$\begin{array}{c} \text{Min. response time} \\ \textbf{t}_{0.5} \end{array}$	20 34 s	4 s (See "Reference conditions SITRANS TS300 Clamp-on" page 2/17)
Degree of protection	IP54 IP68 dep. to connection head, see page 2/14	IP65 for pipe collar, IP67 for elektrical connection

<sup>1)</sup> Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowel-materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

# SITRANS TS

Туре	TS500 for installation	TS500 Type 2	TS500 Type 2N
Description	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)
Application	Temperature sensors for the installation of existing thermowells	Tubular version for minimal to medium stress	Tubular version for minimal to medium stress
Version	Suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001	Thermowell as per DIN43722, Type 2 without process connection	Thermowell Type 2N similar to DIN 43772, screwed in
Туре	With extension • European type • American type	Without extension, plug-in     Use with moveable compression fittings	Without extension
Image			
Catalog page	2/86	2/54	2/58
Article No.	Nr. 7MC750*	7MC751*-0*(A/B)**-0***	7MC751*-1****-0***
Wetted mate- rial	None: Measuring insert made of 1.4571, 1.4404 or 1.4435 (RTD); 2.4816 (TC) (316L; Inconnel600)	1.4404 or 1.4435; 1.4571 (316L; 316Tl)	1.4404 or 1.4435; 1.4571 (316L; 316Tl)
Thermowell types	To order separately	Form 2	Form 2N (similar to form 2)
Process connections	Connection to thermowell:  • M14x1.5  • M18x1.5  • G ½  • ½ NPT	Compression fittings • G ½ • ½ NPT For welding	• G ½ • ½ NPT
Insertion length	• 110 mm (4.33 inch) • 140 mm (5.51 inch) • 200 mm (7.87 inch) • 260 mm (10.24 inch) • 410 mm (16.14 inch)	Variable	• 100 mm (3.94 inch) • 160 mm (6.30 inch) • 230 mm (9.06 inch) • 360 mm (14.17 inch) • 510 mm (20.08 inch)
Neck tube length	as per DIN 43772	as per DIN 43772	not adjustable X=20 mm (0.79 inch)
Sensor elem.	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	Class AA Class A Class B Class 1 Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Conn. heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)
Explosion protection, (ATEX IECEx)	Intrinsic safety "ia", "ic"     Flameproof enclosure "d"     Non sparking "n"	Intrinsic safety "ia", "ic"     Flameproof enclosure "d"     Non sparking "n"	Intrinsic safety "ia", "ic" Flameproof enclosure "d" Non sparking "n"
Output signal	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Pressure vessel and piping	Pressure vessel and piping	Pressure vessel and piping
Limit temperature <sup>1)</sup> [°C (°F)]	Pt100 Basis:     -50 +400 (-58 +752)     Pt100 ext. measuring range:     -196 +600 (-321 +1112)     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)	Pt100 Basis:     -50 +400 (-58 +752)     Pt100 ext. measuring range:     -196 +600 (-321 +1112)     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)	Pt100 Basis:     -50 +400 (-58 +752)     Pt100 ext. measuring range:     -196 +600 (-321 +1112)     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)
Max. nominal pressure 1 (static pressure at 20°C), dimensions in mm (inch)	s. thermowell	Tube Ø9 (0.35):  • 0 150 (0 5.91)  • 150 300 (5.91 11.81)  • Compression fitting Tube Ø12 (0.47):  • 0 150 (0 5.91)  • 150 300 (5.91 11.81)  • Compression fitting 5 bar  75 bar  • Compression fitting 5 bar	Tube Ø9 (0.35):  • 0 150 (0 5.91) 50 bar  • 150 300 (5.91 11.81) 40 bar
Min. response time t <sub>0.5</sub>	s. thermowell	20 45 s	20 34 s
Degree of prot.	IP54 IP68 dep. on connection head see page 2/14	IP54 IP68 dep. on connection head see page 2/14	IP54 IP68 dep. on connection head see page 2/14

<sup>1)</sup> Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

Туре	TS500 Type 2G	TS500 Type 2F	TS500 Type 3				
Description	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings) quicker than form 2				
Application	Pipe version for minimal to medium stress	Pipe version for minimal to medium stress	Pipe version for minimal to medium stress				
Version	Thermowell as per DIN 43722, Type 2G, screwed in	Thermowell as per DIN 43722, Type 2F with flange	Thermowell as per DIN 43722, Type 3 without process connection, improved response time				
Туре	with extension	with extension	Without extension, plug-in     Use with moveable compression fittings				
Image							
Catalog page	2/62	2/66	2/70				
Article No.	7MC751*-1*(A/B)**-1***	7MC751*-2*(A/B)**-1***	7MC751*-0*K**-0***				
Wetted mater.	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)				
Therm. types	Form 2G	Form 2F	Form 3				
Process connections	Welded threads: • G 1 • G ½ • ½ NPT	Welded flange • DN 25, PN 40 • 1RF150 • 1.5RF150 • 1.5RF300	Compression fittings • G ½ • ½ NPT For welding				
Insertion length	<ul><li>160 mm (6.30 inch)</li><li>250 mm (9.84 inch)</li><li>400 mm (15.75 inch)</li></ul>	<ul><li>225 mm (8.86 inch)</li><li>315 mm (12.40 inch)</li><li>465 mm (18.31 inch)</li></ul>	<ul><li>225 mm (8.86 inch)</li><li>315 mm (12.40 inch)</li><li>465 mm (18.31 inch)</li></ul>				
Neck tube length	As per DIN 43772	As per DIN 43772	As per DIN 43772				
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples				
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire				
Sensor accuracy	<ul> <li>Class AA</li> <li>Class A</li> <li>Class B</li> <li>Class 1</li> <li>Class 2</li> </ul>	<ul><li>Class AA</li><li>Class A</li><li>Class B</li><li>Class 1</li><li>Class 2</li></ul>	Class AA Class A Class B Class 1 Class 2				
Connection heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)				
Explosion protection, (ATEX IECEx)	Intrinsic safety "ia", "ic"     Flameproof enclosure "d"     Non sparking "n"	Intrinsic safety "ia", "ic" Flameproof enclosure "d" Non sparking "n"	Intrinsic safety "ia", "ic" Flameproof enclosure "d" Non sparking "n"				
Output signal	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)				
Application	Pressure vessel and piping	Pressure vessel and piping	Pressure vessel and piping				
Limit temperat. <sup>1)</sup> [°C (°F)]	Pt100 Basis:     -50 +400 (-58 +752 )     Pt100 ext. measuring range:     -196 +600 (-321 +1112 )     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)	<ul> <li>Pt100 Basis:</li> <li>-50 +400 (-58 +752 )</li> <li>Pt100 ext. measuring range:</li> <li>-196 +600 (-321 +1112 )</li> <li>Thermocouple:</li> <li>-40 +1100 (-40 +2012)</li> <li>(depends on type)</li> </ul>	Pt100 Basis: -50 +400 (-58 +752 ) Pt100 ext. measuring range: -196 +600 (-321 +1112 ) Thermocouple: -40 +1100 (-40 +2012) (depends on type)				
Max. nominal pressure <sup>1)</sup> (static pres- sure at 20°C), dimensions in mm (inch)	Tube Ø9 (0.35):  • 0 150 mm (0 5.91 inch)  • 150 300 (5.91 11.81)  • Compression fitting  Tube Ø12 (0.47):  • 0 150 (0 5.91)  • 150 300 (5.91 11.81)  50 bar  75 bar  60 bar	Tube Ø9 (0.35):  • 0 150 mm (0 5.91 inch) 50 bar  • 150 300 (5.91 11.81) 40 bar  Tube Ø12 (0.47):  • 0 150 (0 5.91) 75 bar  • 150 300 (5.91 11.81) 60 bar  Note restriction imposed by PN of the flange	Tube Ø12 (0.47):  • 0 200 (0 7.87)  • 200 300 mm (7.87 11.81)  • Compression fitting  75 bar  60 bar  5 bar				
Min. response time t <sub>0.5</sub>	20 34 s	20 34 s	7 15 s				
	IP54 IP68 dep. on connection head see page 2/14	IP54 IP68 dep. on connection head see page 2/14	IP54 IP68 dep. on connection head see page 2/14				

<sup>1)</sup> Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

Туре	TS500 Type 3G	TS500 Type 3F	TS500 Type 4/4F
Description	Temperature sensors for the process industry (vessels and pipings) faster as form 2	Temperature sensors for the process industry (vessels and pipings) faster as form 2	Temperature sensors for the process industry (vessels and pipings)  Quick-respone version available
Applic. area	Tubular version for minimal to medium stress	Tubular version for minimal to medium stress	Tubular version for medium to highest stress
Version	Thermowell as per DIN 43722, Type 3G, screwed in	Thermowell as per DIN 43722, Type 3F with flange	Thermowell to DIN 43722:  • Type 4 for weld-in  • Type 4F with flange
Туре	with extension	with extension	with extension
Image			
Catalog page	2/74	2/78	2/82
Article No.	7MC751*-1*K**-1***	7MC751*-2*K**-1***	7MC752*
Wetted material	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	Form 4F: 1.4404 or 1.4435; 1.4571 (316L; 316TI) Additional Form 4: 1.7335; 1.5415(A 182 F11; A 204 Size A)
Thermowell types	Form 3G	Form 3F	• Form 4 • Form 4F
Process connections	Welded threads: • G 1 • G ½ • ½ NPT	Welded flange • DN 25, PN 40 • 1RF150 • 1.5RF150 • 1.5RF300	For 4 for welding in, Form 4F with flange:  • DN 25, PN 40  • 1RF150  • 1.5RF150  • 1.5RF300
Insertion length	• 160 mm (6.30 inch) • 220 mm (8.66 inch) • 280 mm (11.02 inch)	• 225 mm (8.86 inch) • 285 mm (11.22 inch) • 345 mm (13.58 inch)	Form 4F: as per customer-specification Form 4: • 110 mm (4.33 inch) fast • 140 mm (5.51 inch) fast/normal • 200 mm (7.87 inch) fast/normal • 260 mm (10.23 inch) normal
Neck tube length	As per DIN 43772	As per DIN 43772	As per DIN 43772
Sensor elem.	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	Class AA Class A Class B Class 1 Class 2	Class AA     Class A     Class B     Class 1     Class 2	Class AA     Class A     Class B     Class 1     Class 2
Conn. heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)
Explosion prot., Europe	<ul> <li>Intrinsic safety "ia", "ic"</li> <li>Flameproof enclosure "d"</li> <li>Dust protection "tb"</li> <li>Non sparking "n"</li> </ul>	Intrinsic safety "ia", "ic" Flameproof enclosure "d" Non sparking "n"	Intrinsic safety "ia", "ic"     Flameproof enclosure "d"     Non sparking "n"
Output signal	Sensor signal:	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Vessels and pipings	Vessels and pipings	Vessels and pipings
Limit temperat. <sup>1)</sup> [°C (°F)]	Pt100 Basis:     -50 +400 (-58 +752)     Pt100 ext. measuring range:     -196 +600 °C (-321 +1112)     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)	Pt100 Basis: -50 +400 (-58 +752) Pt100 ext. measuring range: -196 +600 °C (-321 +1112) Thermocouple: -40 +1100 (-40 +2012) (depends on type)	Pt100 Basis:     -50 +400 (-58 +752)     Pt100 ext. measuring range:     -196 +600 °C (-321 +1112)     Thermocouple:     -40 +1100 (-40 +2012)     (depends on type)
Max. nominal pressure <sup>1</sup> (static pres- sure at 20°C), dimensions in mm (inch)	Pipe Ø12 (0.47):  • 0 200 75 bar  • 200 300 60 bar	Pipe Ø12 (0.47):  • 0 200 75 bar • 200 300 60 bar Note restriction imposed by PN of the flange	Mat. (1.4404; 1.4571):
Min. response time t <sub>0.5</sub>	7 15 s	7 15 s	Ø24 mm (0.95 inch): 20 45 s
	IP54 IP68 dep. on connection head, see page 2/14	IP54 IP68 dep. on connection head, see page 2/14	IP54 IP68 dep. on connection head, see page 2/14

Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

Old			Ä			New														
	Length	Material	Number of sensors + Ex		Connection head		Material		PA weights	PA characteristic	Thermowell form	Length of 1st digit	Length of 2nd digit		Neck tube	Connection side	Sensor type	Number of sensors		Ex protection
	Le	Ма	ž		ပိ		Ма		Ρ			Lei	Lei		Ne	ပိ	Sel	ž		Ĕ
7MC1006-		D		1		7MC751	1	-	1	С	Α			-	0		Α			
	1											0	1							
	2											0	4							
	3											1	0							
	4											2	0							
	5											3	1							
			Α															1		
			В															5		
			Е															1	-Z	E01
			F															5	-Z	E01
					1											Α				
					4											В				
					6											С				
					7															
					/											-				
7MC1007-		D		1	<i>'</i>	7MC751	1	-	1	С	А			-	1	•	С			
7MC1007-	5	D	•	1		7MC751	1	-	1	С	A	0	4	-	1	•	С			
7MC1007-		D	•	1		7MC751	1	-	1	С	A			-	1	•	С			
7MC1007-	5	D	-	1		7MC751	1	-	1	С	A	0	4	-	1	•	С	-		
7MC1007-	5	D		1		7MC751	1	-	1	С	A	0	4	-	1	•	С	1		
7MC1007-	5	D	A	1		7MC751	1	-	1	С	A	0	4	-	1	•	C	1		
7MC1007-	5	D	A B	1		7MC751	1	-	1	С	A	0	4	-	1		C		-Z	E01
7MC1007-	5	D	A	1		7MC751	1	-	1	C	A	0	4	-	1		C	1 5	-Z	E01 E01
7MC1007-	5	D	A B E	1		7MC751	1	-	1	C	A	0	4	-	1		C	1 5 1	-Z -Z	E01 E01
7MC1007-	5	D	A B E	1		7MC751	1	-	1	C	A	0	4	-	1	A	C	1 5 1		
7MC1007-	5	D	A B E	1	1 4	7MC751	1	-	1	C	A	0	4	-	1	A	C	1 5 1		
7MC1007-	5	D	A B E	1	1	7MC751	1	-	1	C	A	0	4		1	A	С	1 5 1		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C		1 5 1 5		
7MC1008-	5 6 7	D	A B E	1	1 4 6	7MC751	1		1	C	B	0 1 2	2 2	-	1	A	C	1 5 1		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C		1 5 1 5		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C		1 5 1 5		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C		1 5 1 5		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C -		1 5 1 5		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C -		1 5 1 5		
	5 6 7		A B E F		1 4 6 7 1 1 4 4							0 1 2	2 2	-		A B C M A B B		1 5 1 5		
	5 6 7		A B E F		1 4 6 7							0 1 2	2 2	-		A B C -		1 5 1 5		

Old			×			New														
Olu	£	ial	Number of sensors + Ex		Connection head	New	ial		PA weights	PA characteristic	Thermowell form	Length of 1st digit	Length of 2nd digit		Neck tube	Connection side	Sensor type	Number of sensors		Ex protection
	Length	Material	Ĭ,		on o		Material		¥ ¥	A Ch	Jern	əngı	engl		eck	ou	ens	Ĭ,		r d
7MC1010-		Σ	Ž	2	٠ *	7MC752	Σ		0	N <b>P</b>	F	د	0		Ž	Ö	C	Z		Û
7 IVIC 1010-	1	-		2		7 IVIC / 52	-	-	U	IN	A	0	U	-	1		C			
	2										Α	0			9					N2D: Y45
																				N2D: X45 {Y45:209 mm}
	3										Α	0			9					N2D: X45 {Y45:179 mm}
	4										В	0			1					
	5										В	0			9					N2D: X45 {Y45:179 mm}
	6					_					D	0			1					(116.17611111)
	7					-					D	0			9					N2D: X45 {Y45:179 mm}
	8										E	0			9					N1D: X45 {Y45:119 mm}
		_				-														{Y45:119 mm}
		G F				-	3													
		٢	۸			-	1											1		
			А			-														
			В			-												5	7	F04
			E F			-												1	-Z -Z	E01
			Г		-	-										А		Э	-∠	EUI
					1											В				
					6											С				
					7											-				
7MC1017-		F		1		7MC751	1	-	2	Α	В	-	-	-	9		С			N2D: X45 {Y45:129 mm}
						-						0	4							{Y45:129 mm}
	1					-						0	4							
	2		^			-						1	2					1		
			АВ			-												5		
			E															1	-Z	E01
			F															5	-z -Z	E01
			'		1											Α		5		LOT
					4											В				
					6	-										С				
					7											-				
7MC1041-		F		0		7MC751	1	-	2	Α	K			-	1		С			
	1					1						1	1							
	2					1						1	4							
	3					1						1	7							
		А	А															1		
		А	В			]												5		
		Е	А			]												1	-Z	E01
		Е	В															5	-Z	E01
					1											А				
					4											В				
					6											С				
					7											-				

																0011	VOIC	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	aooi	otai	nce old appliance
Old						New			be												
	e		Number of sensors		Connection head		iter		Measuring insert type		Number of sensors	Length of 1st digit	Length of 2nd digit								Ex protection
	Length		qun		ouu		Diameter		eası	Sensor	qun	engt	engt								x pd
7MC1900-		E	Ā		ŭ	7MC701	8		1	C	Ā	ت	<u>د</u>								ú
7 WIO 1300-	1	_				7100701	0		'			3	3								
	2											4	1								
	3											4	7							-Z	Y44: B=1025 mm
	4											4	7							-Z	Y44: B=1425 mm
7MC1910-		J				7MC701	6	-	1	С											
	1											1	3								
	2											1	7								
	3											2	1								
	4											2	3								
	5											2	5								
	6											2	7								
	7											3	5								
	8											2	0								
			Α								А										
			В								D										
7MC1913-		А			2	7MC701	6	-	1	С										-Z	E01
	1											1	3								
	2											1	7								
	3											2	1								
	4											2	3								
	5											2	5								
	6 7											2	7								
												3	5								
	8		Α	2							А	3	5								
			В	1							D										
			Ь	'							D										
Old	Length	Type of cable		External diameter of sheath		New			External diameter of sheath	Nominal length	Sensor	Number of sensors	Connection side								Ex-protection
		Ţ							Ext	<u>S</u>	Ser	Ž	ဒီ								Ä
7MC2027-		•	А		0	7MC711	1	-	-	-	K	1	1	-	0	А	А	0			
	1									В											
	2									D										-Z	Y44: U=300 mm
	3									D											100
		Α																		-Z	J03
		В																		-Z	S03
		С		4																-Z	L03
				2					-												
				3					-												
				4					_												
				7																	

SITRANS TS

Old	External diameter of sheath	Material of sheath	Type + number of sensor		Length	Ne			External diameter of sheath	Length	Sensor type	Number									Ex-protection
7MC2021-				-Z		7N	IC721	2 -					5	-	0	Α	Α	0			
	2								3												
	4								6												
		C																			
		L	E								J	1									
			F				-				J	4									
			A								-	-									
			В				-				-	-									
			С								K	1									
			D								K	4									
					A01				С										-Z		Y44: U=250 mm
					A02				F												
					A03				M												
					A04				Т												
Old	Length		Number of sensors	External diameter of sheath	Material of sheath	Ne	ew		External diameter of sheath	Length	Sensor type	Number									Ex-protection
71/1/20000									+												
7MC2028-		А		•		7N	IC721	2 -			K	ž	4	-	0	Α	Α	0		7	V44 II 063
/ IVIC/2028-	1	А				7N	IC721	2 -	+	D			4	-	0	Α	A	0		-Z	Y44: U=300 mm
/ IVIC 2028-		A				7M	IC721	2 -	+				4	-	0	A	A	0		-Z	Y44: U=300 mm
7 IVIC 2028-	1	A	С			7N	IC721	2 -	+	D		1	4	-	0	A	A	0		-Z	Y44: U=300 mm
/ INIGZUZ8-	1	A				7N	IC721	2 -	+	D			4	-	0	A	A	0		-Z	Y44: U=300 mm
/ INICZUZ8-	1	A	С	1		7N	IC721	2 -		D		1	4	-	0	A	A	0		-Z	Y44: U=300 mm
/ INICZUZS-	1	A	С			7M	IC721	2 -	-	D		1	4	-	0	A	A	0		-Z	Y44: U=300 mm
/ INICZUZS-	1	A	С	1 2		7N	IC721	2 -	-	D		1	4	-	0	A	A	0		-Z	Y44: U=300 mm
/ INICZUZS-	1	A	С	1 2 3		7N	IC721	2 -	- - - 3	D		1	4	-	0	A	A	0		-Z	Y44: U=300 mm

### Ordering examples

Connection head, Form B	Old	New
Made of cast light alloy, with 1 cable bushing and		
- Screw cover	1	А
- Standard hinged cover	4	В
- Hinged cover high	6	С
• Made of stainless steel, with 1 cable bushing and screw cover	7	-
Measuring insert, single	Α	1
Measuring insert, single, explosion protection	Е	1 and additional E01
Measuring insert, double	В	5
Measuring insert, double, explosion protection	F	5 and additional E01

# More information

# Ordering examples for SITRANS TS100/200

Desired features	Article No.
SITRANS TS100	7MC7111
Sensor diameter	6
Standard length 200 mm (scope of sensor length 101 250 mm)	С
Sensor	A1
flying leads	1
Enclosed compression fitting	A41
Connection cable PVC, 10 m	J10
TAG plate	Y15: TTSA5458

### Full article no.:

#### 7MC7111-6CA11-Z A41+J10+Y15 Y15: TTSA5458

Desired features	Article No.
SITRANS TS100	7MC7111
Sensor diameter	6
Standard length 200 mm (scope of sensor length 101 250 mm)	С
Sensor	A1
flying leads	1
Enclosed compression fitting	A41
Connection cable PVC, 10 m	J10
TAG plate	Y15: TTSA5458
Customer-specific length 211 mm	Y44: 211 mm

## Full article no.:

7MC7111-6CA11-Z A41+J10+Y15+Y44

Y15: TTSA5458 Y44: 211 mm

# Ordering example for SITRANS TS500

Desired features	Article No.
SITRANS TS500	7MC751
Material	1
Process connection	1E
Thermowell form	Α
Insertion length U Standard 250 mm (insertion length customer-specific 220 mm)	12
Extension X customer-specific	9
Head	С
Sensor	Α
Sensor number/Accuracy	1
Extension X customer-specific	N2D
Insertion length U customer-specific	Y44: 220 mm
Extension length X customer-specific	Y45: 200 mm
Plant calibration per 3-point	Y33: 0°C Y33: 50°C Y33: 150°C

# Full article no.:

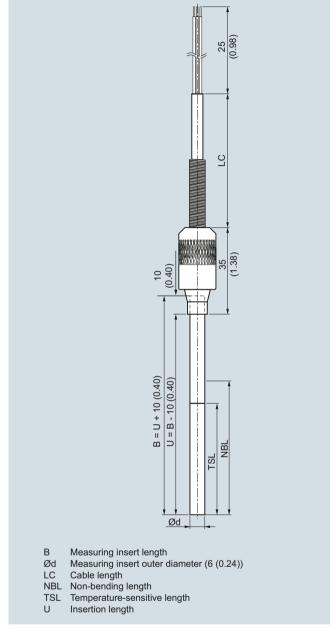
7MC7511-1EA12-9CA1-Z N2D+Y44+Y45 +Y33+Y33+Y33

Y44: 220 mm Y45: 200 mm Y33: 0°C Y33: 50°C Y33: 150°C

SITRANS TS100

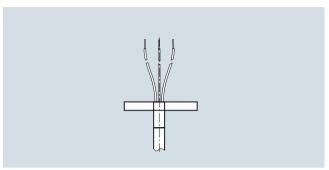
# Cable mineral-insulated

## Dimensional drawings

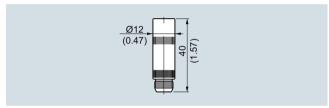


SITRANS TS100, temperature sensors in cable version, universal use, mineral-insulated version, for unfavorable space conditions, IP54 at sensor/cable transition, dimensions in mm (inch)

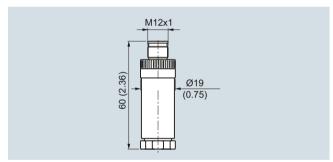
# Design of connection side



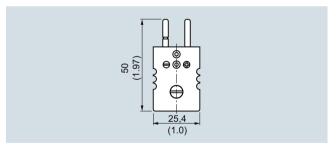
Flying leads, IP00, dimensions in mm (inch)



Coupling LEMO 1S, IP50, dimensions in mm (inch)



M12 plug, IP54, dimensions in mm (inch)



Thermocouple plug, IP20, dimensions in mm (inch)

# Cable mineral-insulated

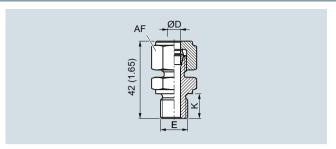
	Article No.
SITRANS TS100	7MC7111-
Temperature sensors in cable version, universal use, mineral-insulated version, for	
unfavorable space conditions	
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor diameter 6 mm (0.24 inch)	6
Length of sensor element B, effective length U = B-10; see dimensional drawings page 2/38	
200 mm (7.87 inch) 500 mm (19.68 inch) 750 mm (29.53 inch)	C D E
Customer-specific length of sensor ele-	
ment B, effective length U = B-10; see	
dimensional drawings page 2/38 enter customer specific length with Y44,	
see Order codes below	
70 100 mm (2.76 3.94 inch)	В
Initial: 100 mm (3.94 inch) 101 250 mm (3.98 9.84 inch)	С
Initial: 200 mm (7.87 inch)	
251 500 mm (9.88 19.68 inch) Initial: 500 mm (19.68 inch)	D
501 750 mm (19.72 29.53 inch)	E
Initial: 750 mm (29.53 inch) 751 1 000 mm (19.72 39.37 inch)	F
Initial: 1 000 mm (39.37 inch)	
1 001 1500 mm (39.4 59.00 inch) Initial: 1 500 mm (59.00 inch)	G
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more	
information, see page 2/16 Pt100, basis, -50 +400 °C	A
(-58 +752 °F) Pt100, vibration-resitant, -50 +400 °C	В
(-58 +752 °F)	
Pt100, expanded range, -196 600 °C (-320.8 1 112 °F)	С
Thermocouple Type K, -40 +1 000 °C	K
(-40 +1 832 °F)	
Thermocouple Type J, only class 2, -40 +750 °C (-40 +1 382 °F)	J
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy	2
(Class 1/Class A) Single, highest accuracy	3
(Class AA)	
Double, basic accuracy (Class 2/Class B)	4
Double, increased accuracy	5
(Class 1/Class A)	
Double, highest accuracy (Class AA)	6
Design of connection side	
Flying leads	1
LEMO coupling 1S M12 connector, not for double Pt100	2 3
Thermocouple coupling, from TC-material	4
(2xTC on request)	

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Customer-specific length of sensor element B, effective length U = B-10 Select range, enter desired length in plain text (No entry = standard length)	Y44
Options	
Add "-Z" to Article No., add options, separate extensions with "+".	
Connection cable, type and length Cable type = 1st letter, Length 1 99 m (3.28 324.80 ft) = 2nd + 3rd place e.g.: 34 m (111.55 ft) connection cable PVC	
(PVC code is J34) with ?? meters connection cable (JJ) PVC/PVC, Operating temperature (-10+105°C) (14 221 °F)	J01 J99
with ?? meters connection cable (SLFP) Silicone/Fluorpolymer, operating temperature -10 +80 °C (-14 +356 °F)	S01 S99
with ?? meters connection cable (TGLV) PTFE/glass fiber/reinforced with stainless steel), Operating temperature (-100+205°C (148 401°F))	L01 L99

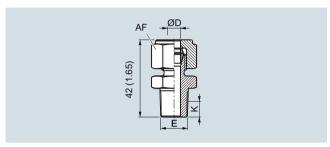
Additional configurations on page after next page! You find ordering examples on page 2/37.

SITRANS TS100

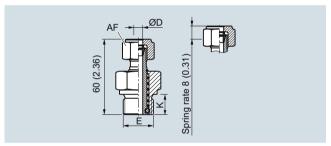
# Cable mineral-insulated



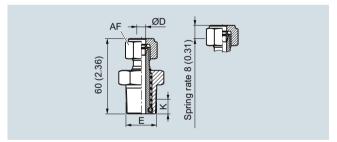
Compression fitting, dimensions in mm (inch)



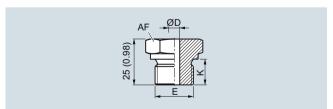
Compression fitting NPT, dimensions in mm (inch)



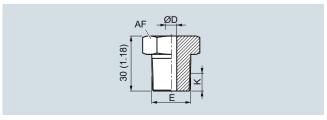
Spring-loaded compression fitting, dimensions in mm (inch)



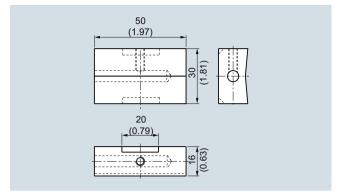
Spring-loaded compression fitting NPT, dimensions in mm (inch)



Soldering nipple, metric, dimensions in mm (inch)



Soldering nipple NPT, dimensions in mm (inch)



Surface connection piece, dimensions in mm (inch)

Cable mineral-insulated

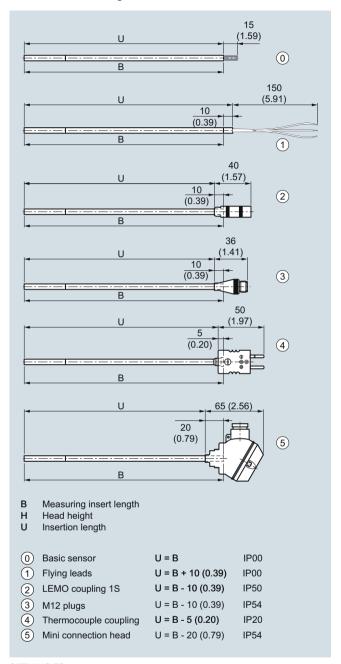
Selection and Ordering data	Order code
Options	
Add "-Z" to Article No., add options, separate extensions with "+".	
Process connection	
Soldering nipple G1/4", enclosed	A20
Soldering nipple G1/2", enclosed	A21
Soldering nipple NPT1/2", enclosed	A22
Soldering nipple M18x1.5, enclosed	A23
Compression fitting G1/4", enclosed	A30
Compression fitting G1/2", enclosed	A31
Compression fitting NPT 1/2", enclosed	A32
Surface connection piece, enclosed (non Ex)	A50
Explosion protection	
Intrinsic safety "ia", "ic"	E01
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate visual: measure-	C34
ment and functional inspection	
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free	C51
(cleaned for e.g. oxygen applications)	
Further options	
Stainless steel TAG plate , Enter lettering in plain text	Y15
Plant calibration per 1 point, enter temperature in plain text, Attention: For devices with built-in head transmitters, select test points within the set measurement range	Y33

You find ordering examples on page 2/37.

SITRANS TS200

### Compact mineral-insulated

# Dimensional drawings



SITRANS TS200, temperature sensors in cable version, universal use, mineral-insulated version, for unfavorable space conditions, dimensions in mm (inch)

SITRANS TS200

# Compact mineral-insulated

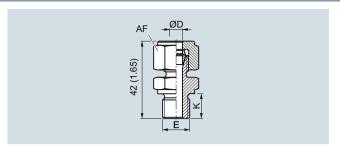
Selection and Ordering data	Article No.
SITRANS TS200 Temperature sensors in compact version, universal use, mineral-insulated version, for unfavorable space conditions	7MC7212-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor diameter 6 mm (0.24 inch)	6
Length of sensor element B, effective length U see dimensional drawing on page 2/42	
200 mm (7.87 inch) 500 mm (19.68 inch) 750 mm (29.53 inch)	C D E
Customer-specific length of sensor ele- ment B, effective length U see dimensional drawing on page 2/42	
enter customer specific length with Y44, see Order codes below 70100 mm (2.76 3.94 inch)	В
Initial: 100 mm (3.94 inch) 101 250 mm (3.98 9.84 inch)	c
Initial: 200 mm (7.87 inch) 251 500 mm (9.88 19.68 inch)	D
Initial: 500 mm (19.68 inch) 501 750 mm (19.72 29.53 inch)	E
Initial: 750 mm (29.53 inch) 751 1 000 mm (29.57 39.37 inch)	F
Initial: 1 000 mm (39.37 inch) 1 001 1 500 mm (39.4 59.00 inch) Initial: 1 500 mm (59.00 inch)	G
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16 Pt100, basis, -50 +400 °C	A
(-58 +752 °F) Pt100, vibration-resistant, -50 +400 °C	В
(-58 +752 °F) Pt100, expanded range,	С
-196 +600 °C (-320.8 +1 112 °F) Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)	К
Thermocouple Type J, only class 2, -40 +750 °C (-40 +1 382 °F)	J
Number/Accuracy Single, basic accuracy	1
(Class 2/Class B) Single, increased accuracy	2
(Class 1/Class A) Single, highest accuracy	3
(Class AA) Double, basic accuracy (Class 2/Class B)	4
(Class 2/Class B) Double, increased accuracy (Class 1/Class A)	5
Double, highest accuracy (Class AA)	6
Design of connection side	
Solid wire ends (sensor element) Flying leads	0
LEMO coupling 1S M12 connector, not for double Pt100	2 3
Thermocouple coupling, from TC-material (2xTC on request)	4
Mini connection head, aluminum, not for dou-	5

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Customer-specific length of sensor element B, effective length, U see dimensional drawing on page 2/42 Select range, enter desired length in plain text (No entry = standard length)	Y44

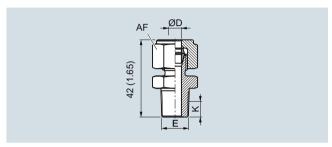
Additional configurations on page after next page! You find ordering examples on page 2/37.

# SITRANS TS200

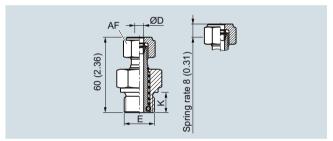
# Compact mineral-insulated



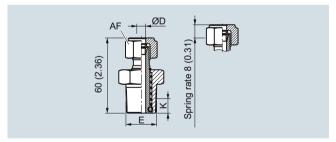
Compression fitting, dimensions in mm (inch)



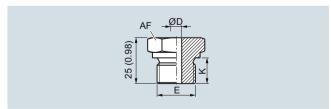
Compression fitting NPT, dimensions in mm (inch)



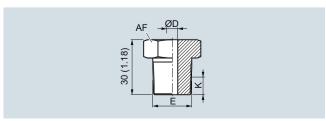
Spring-loaded compression fitting, dimensions in mm (inch)



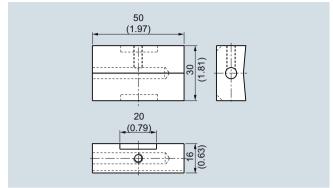
Spring-loaded compression fitting NPT, dimensions in mm (inch)



Soldering nipple, metric, dimensions in mm (inch)



Soldering nipple NPT, dimensions in mm (inch)



Surface connection piece, dimensions in mm (inch)

Compact mineral-insulated

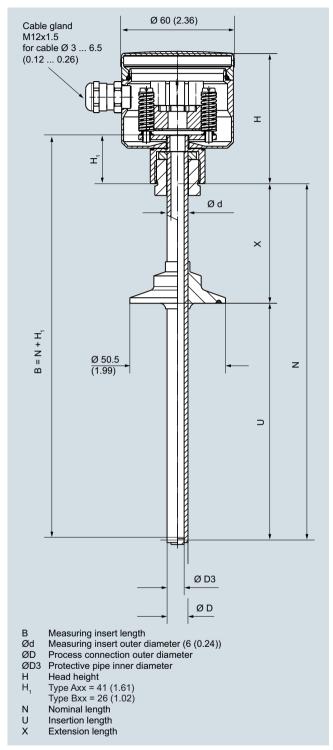
Selection and Ordering data	Order code
Options	
Add "-Z" to Article No., add options, separate extensions with "+".	
Process connection	
Soldering nipple G1/4", enclosed	A20
Soldering nipple G1/2", enclosed	A21
Soldering nipple NPT1/2", enclosed	A22
Soldering nipple M18x1.5, enclosed	A23
Compression fitting G1/4", enclosed	A30
Compression fitting G½", enclosed	A31
Compression fitting NPT1/2", enclosed	A32
Surface connection piece, enclosed (non Ex)	A50
Explosion protection	-
Intrinsic safety "ia", "ic"	E01
Certificates and approvals	-
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate visual, measurement and functional inspection	C34
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	C51
Setting, designation, calibration	-
Stainless steel TAG plate , Enter lettering in plain text	Y15
Plant calibration per 1 point, enter temperature in plain text. Attention: For devices with built-in head transmitters, select test points within the set measurement range	Y33

You find ordering examples on page 2/37.

SITRANS TS300

# For food, pharmaceuticals and biotechnology modular design

### Dimensional drawings



SITRANS TS300 modular design

SITRANS TS300

# For food, pharmaceuticals and biotechnology modular design

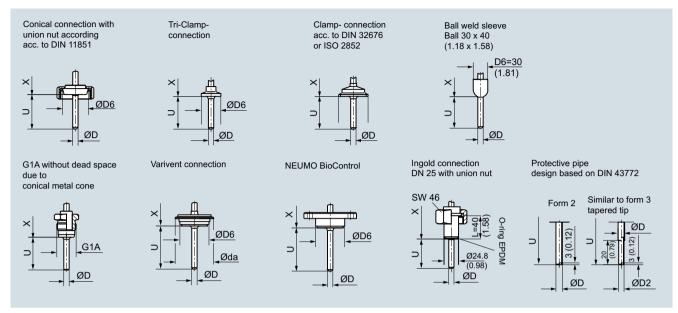
Selection	and Ord	ering data	<b>a</b>	A	rticl	e No	).	Ord	er c	0	de
SITRANS TS300 for food, pharmaceuticals and biotechnology, modular design for installation in pipelines and vessels						3005 0 -		0			
Head Stainless si (Standard)	teel head, E	3S0, screw		5							
Aluminum I Aluminum I Special ver (add Order	code and	hinged con hinged con plain text)		2 3 4 9					н	1	Y
<b>material 1.</b> Milk pipe u	40 40 25	<b>1435/316L</b>   11851 with			AA AB AC AD						
ISO 2852	DIN 32676	Tri-Clamp	Outer diameter D								
– DN 25/ 33.7/38	– DN 25/32/40	½"/ ¾" 1", 1½"	25.0 mm 50.5 mm		C A C B						
DN 40/51 DN 63.5 DN 88.9	– DN 80	2" 2½" –	64.0 mm 77.5 mm 106.0 mm		C C C D C E						
Varivent connection (Tuchenhagen)					KU KV						
and 1½" NEUMO/Bi Size 25 Size 50 Size 65					BA BB BC						
mounting le	hexagon u ength 40 m	m (1.57"), c			J A						
24.8 mm (0.98") incl. O-ring Welding piece (sphere diameter 30 x 40 mm (1.2 x 1.6 inch) long) Special version:					L A Z A					1	v
Type of scr	ewed gland der code a	d and nomi nd plain tex	nal diame- kt)						ľ	•	
Protective Ø D = 6 mr (0.24 inch)		Measuring Ø 3/3.2 mm (0.12/0.13 miner. insu	n, inch)			1					
Ø D =9 mn (0.35 inch)		Ø 6 mm (0	.24 inch)			2					
Ø D =9 mn (0.35 inch) Ø D =9 mn (0.35 inch) tapered tip	n	Ø 6 mm (0 miner. insu Ø 3/3.2 mr (0.12/0.12 miner. insu	I. n, inch)			3 4					
$D_2 = 5 \emptyset x$ (0.2 x 0.79 Special ver	inch)					9			L	1	Υ

Selection and Ordering data	A	۱rt	icl	e	No	<b>)</b> .	_	Ο	rde	er	C	00	de
SITRANS TS300	_	Article No. Order co											
for food, pharmaceuticals and biotechnology, modular design for installation in pipelines and vessels					0		ľ		0	Ì	i		
Neck tube length X 65 mm (2.56 inch) [M = 80 mm (3.15 inch)] 130 mm (5.12 inch) [M = 145 mm (5.71 inch)] Special version: (add Order code and plain text)						1	1 2 9			1	١.	1 '	Y
Insertion length Enter customer specific length with Y44, see Order codes below 15 mm (0.59 inch) 16 35 mm (0.631.38 inch) Initial: 35 mm (1.38 inch) 36 50 mm (1.42 1.97 inch) Initial: 50 mm (1.97 inch) 51 100 mm (2.01 3.94 inch) Initial: 100 mm (3.98 6.30 inch) Initial: 100 mm (6.30 inch) 161 250 mm (6.34 9.84 inch) Initial: 250 mm (9.84 inch) 251 400 mm (9.88 15.75 inch) Initial: 400 mm (15.75 inch) 1 4 inch, Initial: 4 inch 4 6 inch, Initial: 6 inch 6 9 inch, Initial: 9 inch Special version: (add Order code and plain text)							E C C C C C C C C C C C C C C C C C C C	; ; : : :			<b>.</b>	11	Y
Sensor Thin-film technology: measuring range -50 +400 °C (-58 +752 °F) 2 x Pt100, class A, three-wire 1 x Pt100, class A, four-wire Special version: (add Order code and plain text)								G H Z		(	. c	1 '	Y
Further designs Add "-Z" to Article No. and add Order code	(	Orc	de	r	00	de	Э						
Process connection completely electropolished Hygiene version ( $R_a < 0.8  \mu m  (3.1 \times 10^{-5}  \text{inch})$ ) Certificates • Roughness depth measurement $R_a$ certified by factory certificate to EN 10204-3.1 • Material certificate to EN 10204-3.1 TAG plate made of stainless steel specify TAG No. in plain text Test report (at 0, 50 and 100%) specify measuring range in plain text If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y01 addition is always required.	H	101 101 112 115 115	3										
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y	'44	1										

SITRANS TS300

# For food, pharmaceuticals and biotechnology modular design

# Dimensional drawings



Process connections, dimensions in mm (inch)

### **Temperature Measurement** SITRANS TS300

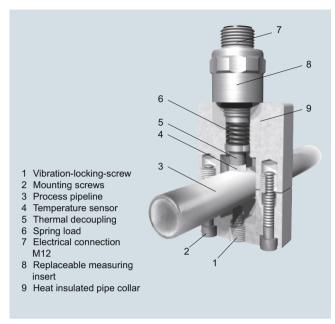
For food, pharmaceuticals and biotechnology modular design

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y11".	
SITRANS TH100, 4 20 mA, Pt100	T10
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T11
SITRANS TH200, 4 20 mA, universal	T20
SITRANS TH200 Ex i(ATEX), 4 20 mA, universal	T21
SITRANS TH300, HART, universal	T30
SITRANS TH300 Ex i (ATEX), HART, universal	T31
SITRANS TH400 PA, universal	T40
SITRANS TH400 PA Ex i, universal	T41
SITRANS TH400 FF, universal	T45
SITRANS TH400 FF Ex i, universal	T46
Transmitter options	
Transmitter, enter complete setting in plain text (Y11:+/-NNNN +/-NNNN C,F)	Y11
Enter measuring point (max. 8 characters) in plain text	Y17
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max. 32 characters) in plain text	Y24
Transmitter, enter bus address in plain text	Y25
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	U36
Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity	C23
Transmitter test protocol (5 points)	C11
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex) $$	G12
Option not found?	
Specify special version in plain text	Y98
Process number for the special version	Y99

SITRANS TS300

### For food, pharmaceuticals and biotechnology clamp-on design

#### Dimensional drawings



Resitance thermometer with protection pipe in Clamp-on design, dimensions in mm (inch)

SITRANS TS300

### For food, pharmaceuticals and biotechnology clamp-on design

			Fo
Selection and	Ordering data	Article No.	Ord. code
SITRANS TS300		7MC8016-	0
for food, pharma nology	ceuticals and biotech-		
the pipe surface	•		
	icle No. for the online con- PIA Life Cycle Portal.		
<b>Design</b> Acc. to IEC 60751	L class A	1	
[-40 +150 °C (-	40 +302 °F)]		
[100 150 °C (21	d for steam sterilization 12 302 °F)]	0	
Type of connecti			
Round connector connection head to	form B, stainless steel	E	
4 20 mA compa	ct transmitter im (standard measuring	C	;
range 0 100 °C			
Mounting with pi	•		
Pipe outer-Ø mm (inch)	Collar size mm (inch)		
4 (0.16) 6 (0.24)			A1 B1
6.35 (0.25)			C1
8 (0.31)			D1
9.35 (0.37) 10 (0.39)			E1 F1
10.2 (0.40)	50 x 35 x 20 (1.97 x 1.38 x 0.79)		G1
10.3 (0.41) 12 (0.47)	,		H1 J1
12.7 (0.50)			K1
13 (0.51) 13.5 (0.53)			L1 M1
13.7 (0.54)			N1
14 (0.55) 15.88 (0.62)			P1 Q1
16 (0.63)			R1
17.2 (0.68)		_	S1
18.0 (0.71) 19.0 (0.74)			A2 B2
19.05 (0.75)			C2
20.0 (0.79) 21.3 (0.84)			D2 E2
22.0 (0.87)			F2
23.0 (0.90) 24.0 (0.94)			G2 H2
25.0 (0.98)			J2
25.4 (1.00) 26.7 (1.05)			K2 L2
26.9 (1.06)	70 × 70 × 20		M2
28.0 (1.10) 29.0 (1.14)	$(2.76 \times 2.76 \times 0.79)$		N2 P2
30.0 (1.18)			Q2
31.8 (1.25) 32.0 (1.26)			R2 S2
33.4 (1.31)			T2
33.7 (1.33) 34.0 (1.34)			U2 V2
35.0 (1.38) 36.0 (1.42)			W2 X2
36.0 (1.42) 38.0 (1.49)			Y2
00.0 (1.70)			

Selection and C	Ordering data	Article No.	Ord	. code
SITRANS TS300		7MC8016-	0	
	ceuticals and biotech-			
nology Clamp-on design the pipe surface t	for the measuring of emperature			
38.1 (1.50)			А3	
41.0 (1.61)			В3	
42.4 (1.67)			СЗ	
44.5 (1.75)			D3	
48.3 (1.90)	90 x 85 x 20		E3	
50.8 (2.00)	$(3.54 \times 3.35 \times 0.79)$		F3	
53.0 (2.09)			G3	
54.0 (2.13)			НЗ	
57.0 (2.24)			J 3	
Special size <sup>1)</sup>			Z0	K1 Y

Recommended for all versions: Heat-conductive-compound, silicone-free, syringe 3 g, Order code: L15 (see page 2/53)

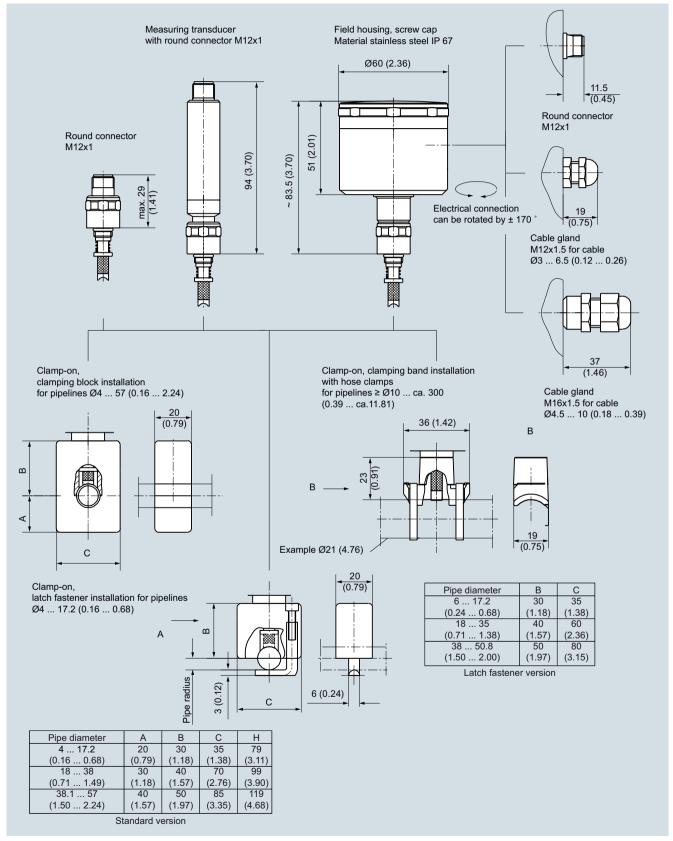
Special sizes for pipe outer diameters: In order to process "Z0" special sizes, the following two additional items of information are essential:

 the required diameter specified in plain text under "K1Y"
 Selection of the corresponding pipe collar, clamping band or clamping bracket size (Order codes "S11" to "S35")

SITRANS TS300

#### For food, pharmaceuticals and biotechnology clamp-on design

#### Dimensional drawings



SITRANS TS300 Clamp-on design, round connector, field housing, cable gland, variants, dimensions in mm (inch)

SITRANS TS300

# For food, pharmaceuticals and biotechnology clamp-on design

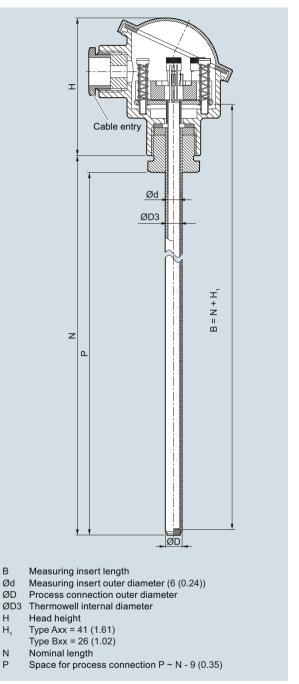
Further designs           Add '-Z' to Article No. and specify Order code.           Bullt in head transmitter Measuring range to be set must be specified with plain text data 'Y11'.         T10           SITRANS TH100, 4 20 mA, Pt100         T10           SITRANS TH200, 4 20 mA, universal         T20           SITRANS TH200 Ex i (ATEX), 4 20 mA, universal         T21           SITRANS TH200 Ex i (ATEX), 4 20 mA, universal         T30           SITRANS TH300, HART, universal         T31           SITRANS TH400 PA, universal         T40           SITRANS TH400 PA, universal         T41           SITRANS TH400 FF Ex i, universal         T45           SITRANS TH400 FF Ex i, universal         T46           Transmitter enter complete setting in plain text         Y11           Y11:+/-NNNN +/-NNNN C,F)         Y11           Enter measuring point (max. 8 characters) in plain text         Y17           Transmitter, enter measuring point description (max. 16 characters) in plain text         Y23           Transmitter, enter bus address in plain text         Y24           Transmitter, tail-safe value 3.6 mA         U36           (instead of 22.8 mA)         U36           Transmitter with a SIL 2/3 conformity         C20           Transmitter with a SIL 2/3 conformity         C23 </th <th></th> <th></th>		
Add *-Z* to Article No. and specify Order code.  Built in head transmitter Measuring range to be set must be specified with plain text data *Y11*.  SITRANS TH100, 4 20 mA, Pt100 T11  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100 T11  SITRANS TH200 Ex i (ATEX), 4 20 mA, universal T20  SITRANS TH200 Ex i (ATEX), 4 20 mA, universal T31  SITRANS TH300, HART, universal T30  SITRANS TH300, Ex i (ATEX), HART, universal T31  SITRANS TH400 PA, universal T40  SITRANS TH400 PA Ex i, universal T45  SITRANS TH400 FF, universal T45  SITRANS TH400 FF Ex i, universal T45  SITRANS TH400 FF Ex i, universal T46  Transmitter options  Transmitter enter complete setting in plain text (Y11:+/-INNN +/-INNN C.F)  Enter measuring point (max. 8 characters) in plain text (Y11:+/-INNN +/-INNN C.F)  Enter measuring point text (max. 32 characters) in plain text (max. 32 characters) in plai	Selection and Ordering data	Order code
Measuring range to be set must be specified with plain text data "Y11".         T10           SITRANS TH100, 4 20 mA, Pt100         T10           SITRANS TH100, 5 20 mA, Pt100         T11           SITRANS TH100, 4 20 mA, universal         T20           SITRANS TH200, 4 20 mA, universal         T20           SITRANS TH200 Ex i (ATEX), 4 20 mA, universal         T21           SITRANS TH300, HART, universal         T30           SITRANS TH400 PA, universal         T41           SITRANS TH400 PA Ex i, universal         T41           SITRANS TH400 PF Ex i, universal         T45           SITRANS TH400 FE x i, universal         T45           TFTANSMITTER of third in thi	9	
SITRANS TH100, 4 20 mA, Pt100  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, universal  SITRANS TH200 Ex i (ATEX), 4 20 mA, universal  SITRANS TH200 Ex i (ATEX), 4 20 mA, universal  SITRANS TH300, HART, universal  SITRANS TH300 Ex i (ATEX), HART, universal  SITRANS TH400 PA, universal  SITRANS TH400 PA Ex i, universal  SITRANS TH400 FF, universal  SITRANS TH400 FF, universal  T45  SITRANS TH400 FF Ex i, universal  T46  Transmitter options  Transmitter, enter complete setting in plain text  (Y11:+/-NNNN +/-NNNN C,F)  Enter measuring point (max. 8 characters) in plain text  (Y11:+/-NNNN +/-NNNN C,F)  Enter measuring point (max. 8 characters) in plain text  Transmitter, enter measuring point text  (max. 16 characters) in plain text  Transmitter, enter bus address in plain text  Transmitter with a SIL 2 conformity  C20  Transmitter with a SIL 2 conformity  C23  Transmitter with a SIL 2/3 conformity  C23  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter  4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1   Deviating pipe;	Measuring range to be set must be specified with plain	
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, universal  SITRANS TH200, 4 20 mA, universal  SITRANS TH200 Ex i (ATEX), 4 20 mA, universal  SITRANS TH300, HART, universal  SITRANS TH300 Ex i (ATEX), HART, universal  SITRANS TH400 PA, universal  SITRANS TH400 PA Ex i, universal  SITRANS TH400 FF, universal  T41  SITRANS TH400 FF, universal  T45  SITRANS TH400 FF Ex i, universal  T46  Transmitter options  Transmitter, enter complete setting in plain text  (Y11:+/-NNNN +/-NNNN C,F)  Enter measuring point (max. 8 characters) in plain text  (Y11:+/-NNNN +/-NNNN C,F)  Enter measuring point text  Transmitter, enter measuring point text  (max. 16 characters) in plain text  Transmitter, enter bus address in plain text  Transmitter, enter bus address in plain text  Transmitter, enter bus address in plain text  Transmitter, tall-safe value 3.6 mA  (instead of 22.8 mA)  Transmitter with a SIL 2 conformity  C20  Transmitter with a SIL 2/3 conformity  C23  Transmitter with a SIL 2/3 conformity  C23  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter  45 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  45 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe; mm (inch)  4 17.2 (0.16 0.68)  S0 x 35 (1.97 x 1.38)  S11  Ba 38 (0.71 1.49)  Tyo x 70 (2.76 x 2.76)  S12  S13  Larger nominal diameters on request  S19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch):  4 17.2 (0.16 0.68)  S21  S22  Clamping band version recommended, see below)  38 50.8 (1.45 2.00)  Clamping band version recommended, see below)		T10
STRANS TH200, 4 20 mA, universal   T20		
SITRANS TH300, HART, universal   T30	•	T20
SITRANS TH300 Ex i (ATEX), HART, universal   T40	SITRANS TH200 Ex i (ATEX), 4 20 mA, universal	T21
SITRANS TH400 PA, universal   T40	SITRANS TH300, HART, universal	T30
T41	SITRANS TH300 Ex i (ATEX), HART, universal	T31
SITRANS TH400 FF, universal	SITRANS TH400 PA, universal	T40
Transmitter options   Transmitter, enter complete setting in plain text (Y11:+/-NNNN +/-NNNN C,F)	SITRANS TH400 PA Ex i, universal	T41
Transmitter options         71           Transmitter, enter complete setting in plain text (Y11:+/-NNNN +/-NNNN C,F)         Y11           Enter measuring point (max. 8 characters) in plain text         Y17           Transmitter, enter measuring point description (max. 16 characters) in plain text         Y23           Transmitter, enter measuring point text (max. 32 characters) in plain text         Y24           Transmitter, enter bus address in plain text         Y25           Transmitter, enter bus address in plain text         Y26           Transmitter, enter measuring point description         (max. 32 characters) in plain text         Y24           Transmitter, enter measuring point description         (max. 32 characters) in plain text         Y24           Transmitter, enter measuring point text         Y24         (max. 32 characters) in plain text         Y25           Transmitter, enter measuring point text         Y25         Z20         Transmitter description         X26           Transmitter destrate with a SIL 2/3 conformity <td>SITRANS TH400 FF, universal</td> <td>T45</td>	SITRANS TH400 FF, universal	T45
Transmitter, enter complete setting in plain text (Y11:+/-NNNN +/-NNNN C,F)         Y11           Enter measuring point (max. 8 characters) in plain text (Y17:+/-NNNN +/-NNNN C,F)         Y17           Enter measuring point (max. 8 characters) in plain text (max. 16 characters) in plain text         Y23           Transmitter, enter measuring point text (max. 32 characters) in plain text         Y24           Transmitter, enter bus address in plain text         Y25           Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)         U36           Transmitter with a SIL 2 conformity         C20           Transmitter with a SIL 2/3 conformity         C23           Transmitter test protocol (5 points)         C11           Other cable gland (only for connection head)         K02           Polyamide for cable diameter         K02           4.5 10 mm (0.18 0.39 inch)         K11           Stainless steel for cable diameter         K03           3 6,5 mm (0.12 0.25 inch)         K01           Round connector M12 x 1         K11           Deviating pipe; mm (inch)         Collar size; mm (inch)           4 17.2 (0.16 0.68)         50 x 35 (1.97 x 1.38)         S11           18 38 (0.71 1.49)         70 x 70 (2.76 x 2.76)         S12           38.1 57 (1.5 2.24)         90 x 85 (3.54 x 3.35)	SITRANS TH400 FF Ex i, universal	T46
(Y11:+/-NNNN +/-NNNN C,F)         Enter measuring point (max. 8 characters) in plain text         Transmitter, enter measuring point description (max. 16 characters) in plain text         Transmitter, enter measuring point text (max. 32 characters) in plain text         Transmitter, enter bus address in plain text         Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)         Transmitter with a SIL 2 conformity         C20         Transmitter with a SIL 2/3 conformity         C23         Transmitter test protocol (5 points)         C11         Other cable gland (only for connection head)         Polyamide for cable diameter       K02         4.5 10 mm (0.18 0.39 inch)       K01         Stainless steel for cable diameter       K03         3 6,5 mm (0.12 0.25 inch)       K01         Round connector M12 x 1       K11         Deviating pipe; mm (inch)       Collar size; mm (inch)         4 17.2 (0.16 0.68)       50 x 35 (1.97 x 1.38)       S11         18 38 (0.71 1.49)       70 x 70 (2.76 x 2.76)       S12         38.1 57 (1.5 2.24)       90 x 85 (3.54 x 3.35)       S13         Larger nominal diameters on request       S19         Space-saving mounting (latch fastening)       S21         18 35 (0.	Transmitter options	
Transmitter, enter measuring point description (max. 16 characters) in plain text  Transmitter, enter measuring point text (max. 32 characters) in plain text  Transmitter, enter bus address in plain text  Transmitter, enter bus address in plain text  Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)  Transmitter with a SIL 2 conformity  Transmitter with a SIL 2/3 conformity  Transmitter with a SIL 2/3 conformity  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter  4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter  3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe; mm (inch)  4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) \$11  18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) \$12  38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) \$13  Larger nominal diameters on request \$19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch):  4 17.2 (0.16 0.68) \$21  18 35 (0.71 1.38) (Clamping band version recommended, see below)  Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  Outer pipe; mm (inch):  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  Outer pipe; mm (inch):  Clamping band fastening (specify external tube diameter same as for standard collar)	Transmitter, enter complete setting in plain text (Y11:+/-NNNN +/-NNNN C,F)	Y11
(max. 16 characters) in plain text         Transmitter, enter measuring point text         (max. 32 characters) in plain text         Transmitter, enter bus address in plain text         Transmitter, fail-safe value 3.6 mA         (instead of 22.8 mA)         Transmitter with a SIL 2 conformity         C20         Transmitter with a SIL 2/3 conformity         C23         Transmitter test protocol (5 points)         Other cable gland (only for connection head)         Polyamide for cable diameter         4.5 10 mm (0.18 0.39 inch)         Stainless steel for cable diameter         3 6,5 mm (0.12 0.25 inch)         Round connector M12 x 1         Deviating pipe;         mm (inch)         4 17.2 (0.16 0.68)       50 x 35 (1.97 x 1.38)         18 38 (0.71 1.49)       70 x 70 (2.76 x 2.76)         38.1 57 (1.5 2.24)       90 x 85 (3.54 x 3.35)         S13         Larger nominal diameters on request         Space-saving mounting (latch fastening)         Outer pipe; mm (inch):         4 17.2 (0.16 0.68)         18 35 (0.71 1.38)         (Clamping band version recommended, see below)         S23         Clamping band fastening (specify exter	Enter measuring point (max. 8 characters) in plain text	Y17
(max. 32 characters) in plain text         Transmitter, enter bus address in plain text         Transmitter, fail-safe value 3.6 mA         (instead of 22.8 mA)         Transmitter with a SIL 2 conformity         C20         Transmitter with a SIL 2/3 conformity       C23         Transmitter test protocol (5 points)       C11         Other cable gland (only for connection head)       K02         Polyamide for cable diameter       K03         3 6,5 mm (0.18 0.39 inch)       K03         Stainless steel for cable diameter       K03         3 6,5 mm (0.12 0.25 inch)       K11         Round connector M12 x 1       K11         Deviating pipe; mm (inch)       Collar size; mm (inch)         4 17.2 (0.16 0.68)       50 x 35 (1.97 x 1.38)       S11         18 38 (0.71 1.49)       70 x 70 (2.76 x 2.76)       S12         38.1 57 (1.5 2.24)       90 x 85 (3.54 x 3.35)       S13         Larger nominal diameters on request       S19         Space-saving mounting (latch fastening)         Outer pipe; mm (inch):       \$21         4 17.2 (0.16 0.68)       \$21         18 35 (0.71 1.38)       \$22         (Clamping band version recommended, see below)         Clamping b		Y23
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)  Transmitter with a SIL 2 conformity  Transmitter with a SIL 2/3 conformity  Transmitter with a SIL 2/3 conformity  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe;	Transmitter, enter measuring point text (max. 32 characters) in plain text	Y24
(instead of 22.8 mA)  Transmitter with a SIL 2 conformity  Transmitter with a SIL 2/3 conformity  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe; Collar size; mm (inch) 4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) S11 18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) S12 38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) S13  Larger nominal diameters on request S19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch): 4 17.2 (0.16 0.68) S21 18 35 (0.71 1.38) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) S31 58 220 (2.28 8.66) S32	Transmitter, enter bus address in plain text	Y25
Transmitter with a SIL 2/3 conformity  Transmitter test protocol (5 points)  C11  Other cable gland (only for connection head)  Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe; Collar size; mm (inch) 4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) S11 18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) S12 38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) S13  Larger nominal diameters on request S19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch): 4 17.2 (0.16 0.68) S21 18 35 (0.71 1.38) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) S31 58 220 (2.28 8.66) S32	Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	U36
Transmitter test protocol (5 points)  Other cable gland (only for connection head)  Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1  Deviating pipe; Collar size; mm (inch) 4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) \$11 18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) \$12 38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) \$13  Larger nominal diameters on request \$19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch): 4 17.2 (0.16 0.68) \$21 18 35 (0.71 1.38) \$22 (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) \$31 58 220 (2.28 8.66) \$32	Transmitter with a SIL 2 conformity	C20
Other cable gland (only for connection head)  Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1   Collar size; mm (inch) 4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) 18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) 18 38 (0.71 1.49) 19 0 x 85 (3.54 x 3.35) 13 Larger nominal diameters on request  Space-saving mounting (latch fastening)  Outer pipe; mm (inch): 4 17.2 (0.16 0.68) 18 35 (0.71 1.38) (Clamping band version recommended, see below)  Stain 18 35 (0.71 1.38) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24) 58 220 (2.28 8.66)  S32	Transmitter with a SIL 2/3 conformity	
Polyamide for cable diameter 4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1 K11  Deviating pipe; Collar size; mm (inch) mm (inch)  4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) S11  18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) S12  38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) S13  Larger nominal diameters on request S19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch):  4 17.2 (0.16 0.68) S21  18 35 (0.71 1.38) S22  (Clamping band version recommended, see below)  38 50.8 (1.45 2.00) S23  (Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24) S31  58 220 (2.28 8.66) S32	Transmitter test protocol (5 points)	C11
4.5 10 mm (0.18 0.39 inch)  Stainless steel for cable diameter 3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1 K11  Deviating pipe;		KUS
3 6,5 mm (0.12 0.25 inch)  Round connector M12 x 1		NU2
Round connector M12 x 1  Deviating pipe; mm (inch)  4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) S11  18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) S12  38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) S13  Larger nominal diameters on request S19  Space-saving mounting (latch fastening)  Outer pipe; mm (inch):  4 17.2 (0.16 0.68) S21  18 35 (0.71 1.38) S22  (Clamping band version recommended, see below)  38 50.8 (1.45 2.00) S23  (Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24) S31  58 220 (2.28 8.66) S32		K03
mm (inch)         mm (inch)           4 17.2 (0.16 0.68)         50 x 35 (1.97 x 1.38)         \$11           18 38 (0.71 1.49)         70 x 70 (2.76 x 2.76)         \$12           38.1 57 (1.5 2.24)         90 x 85 (3.54 x 3.35)         \$13           Larger nominal diameters on request         \$19           Space-saving mounting (latch fastening)           Outer pipe; mm (inch):         \$21           4 17.2 (0.16 0.68)         \$21           18 35 (0.71 1.38)         \$22           (Clamping band version recommended, see below)         \$23           (Clamping band version recommended, see below)         \$23           Clamping band fastening (specify external tube diameter same as for standard collar)         \$31           Outer pipe; mm (inch):         \$31           10 57 (0.39 2.24)         \$31           58 220 (2.28 8.66)         \$32		K11
4 17.2 (0.16 0.68) 50 x 35 (1.97 x 1.38) \$11 18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) \$12 38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) \$13 Larger nominal diameters on request \$19  Space-saving mounting (latch fastening) Outer pipe; mm (inch): 4 17.2 (0.16 0.68) \$21 18 35 (0.71 1.38) \$22 (Clamping band version recommended, see below) 38 50.8 (1.45 2.00) \$23 (Clamping band fastening (specify external tube diameter same as for standard collar) Outer pipe; mm (inch): 10 57 (0.39 2.24) \$31 58 220 (2.28 8.66) \$32	Deviating pipe; Collar size;	
18 38 (0.71 1.49) 70 x 70 (2.76 x 2.76) \$12 38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) \$13 Larger nominal diameters on request \$19  Space-saving mounting (latch fastening) Outer pipe; mm (inch): 4 17.2 (0.16 0.68) \$21 18 35 (0.71 1.38) \$22 (Clamping band version recommended, see below) 38 50.8 (1.45 2.00) \$23 (Clamping band fastening (specify external tube diameter same as for standard collar) Outer pipe; mm (inch): 10 57 (0.39 2.24) \$31 58 220 (2.28 8.66) \$32		011
38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35) S13 Larger nominal diameters on request S19  Space-saving mounting (latch fastening) Outer pipe; mm (inch): 4 17.2 (0.16 0.68) S21 18 35 (0.71 1.38) (Clamping band version recommended, see below) 38 50.8 (1.45 2.00) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) S31 58 220 (2.28 8.66) S32		
Space-saving mounting (latch fastening)         Outer pipe; mm (inch):         4 17.2 (0.16 0.68)       \$21         18 35 (0.71 1.38)       \$22         (Clamping band version recommended, see below)       \$23         (Clamping band version recommended, see below)       \$23         Clamping band fastening (specify external tube diameter same as for standard collar)       \$31         Outer pipe; mm (inch):       \$31         58 220 (2.28 8.66)       \$32	38.1 57 (1.5 2.24) 90 x 85 (3.54 x 3.35)	S13
Outer pipe; mm (inch): 4 17.2 (0.16 0.68) 18 35 (0.71 1.38) (Clamping band version recommended, see below) 38 50.8 (1.45 2.00) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) 58 220 (2.28 8.66)  S21 S22 S23 S23 S23 S21 S23 S23 S23 S23 S24 S31 S32		S19
4 17.2 (0.16 0.68)  18 35 (0.71 1.38) (Clamping band version recommended, see below)  38 50.8 (1.45 2.00) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24)  58 220 (2.28 8.66)  S21  S22  S23  S23		
(Clamping band version recommended, see below) 38 50.8 (1.45 2.00) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch): 10 57 (0.39 2.24) 58 220 (2.28 8.66)  S32		S21
38 50.8 (1.45 2.00) (Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24)  58 220 (2.28 8.66)  S32	18 35 (0.71 1.38)	S22
(Clamping band version recommended, see below)  Clamping band fastening (specify external tube diameter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24)  58 220 (2.28 8.66)  \$32		S23
ter same as for standard collar)  Outer pipe; mm (inch):  10 57 (0.39 2.24)  58 220 (2.28 8.66)  \$32		
10 57 (0.39 2.24)	Clamping band fastening (specify external tube diameter same as for standard collar)	<b>)-</b>
58 220 (2.28 8.66) <b>\$32</b>	Outer pipe; mm (inch):	
	10 57 (0.39 2.24)	S31
Without clamping band \$35	58 220 (2.28 8.66)	S32
	Without clamping band	S35

Selection and Ordering data	Order code
Further Options Assignment marking, engraving instead of adhesive label (Serial number and pipe diameter on plug and plastic block)	L11
2 mm drain hole Sensor 4-wire connection Heat-conductive-compound, silicone-free, syringe 3 g	L12 L14 L15
Suffixes	
Add "-Z" to Article No. and specify Order code and plain text.	
TAG plate made of stainless steel (specify TAG No. in plain text)	Y15
Test report at 50 % and 100 % (specify the measuring range in plain text) If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y01 addition is always required.  Special version, specify in plain text Process number for special version	Y98 Y99

SITRANS TS500

### Type 2, tubular version without process connection

### Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipings, tubular version for minimal to medium stress, without process connection, without extension, plug-in or use with moveable compression fittings, dimensions in mm (inch)

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SITRANS TS500

### Type 2, tubular version without process connection

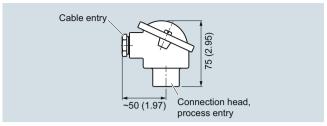
Selection and Ordering data	Article No.
SITRANS TS500 Pipe version for minimal to medium	7MC751-
stress, as per thermowell DIN 43722,	
Type 2, without process connection,	
without extension, plug-in or use with moveable compression fittings	
✓ Click on the Article No. for the online	
configuration in the PIA Life Cycle Por-	
tal.	
Material, in contact with media	
316Ti (1.4571) 316L (1.4404 or 1.4435)	1 2
Process connection	_ 2
Without process connection (for compres-	0 N
sion fitting) N=U	
Thermowell form	
2; 9 mm (0.35 inch) 2; 12 mm (0.47 inch)	A B
	_ B
Insertion length U (=N), Standard 160 mm (6.3 inch)	0 4
250 mm (9.84 inch)	1 2
400 mm (15.75 inch)	2 2
Insertion length U (=N), customer-specific	
enter customer specific length with Y44,	
see Order codes on page 2/57	
80 100 mm (3.15 3.94 inch) Initial: 100 mm (3.94 inch)	0 1
101 120 mm (3.98 4.72 inch)	0 2
Initial: 120 mm (4.72 inch)	
121 140 mm (4.76 5.51 inch) Initial: 140 mm (5.51 inch)	0 3
141 160 mm (5.55 6.30 inch)	0 4
Initial: 160 mm (6.3 inch)	• •
161 180 mm (6.34 7.09 inch)	0 5
Initial: 180 mm (7.09 inch) 181 200 mm (7.13 7.87 inch)	0 6
Initial: 200 mm (7.87 inch)	
201 220 mm (7.91 8.66 inch)	0 7
Initial: 220 mm (8.66 inch)	4.4
221 240 mm (8.7 9.45 inch) Initial: 225 mm (8.86 inch)	11
241 260 mm (9.48 10.24 inch)	1 2
Initial: 250 mm (9.84 inch)	
261 280 mm (10.28 11.02 inch) Initial: 280 mm (11.02 inch)	1 3
281 300 mm (11.02 11.81 inch)	1 4
Initial: 285 mm (11.22 inch)	
301 320 mm (11.85 12.6 inch) Initial: 315 mm (12.4 inch)	1 5
321 340 mm (12.64 13.39 inch)	1 6
Initial: 340 mm (13.39 inch)	
341 360 mm (13.43 14.17 inch) Initial: 360 mm (14.17 inch)	2 0
361 380 mm (14.21 14.96 inch)	2 1
Initial: 380 mm (14.96 inch)	
381 400 mm (15 15.75 inch)	2 2
Initial: 400 mm (15.75 inch) 401 420 mm (15.79 16.54 inch)	2 3
Initial: 420 mm (16.54 inch)	
421 440 mm (16.57 17.32 inch) Initial: 440 mm (17.32 inch)	2 4
· · ·	2.5
441 460 mm (17.36 18.11 inch) Initial: 460 mm (18.11 inch)	2 5
461 480 mm (18.15 18.90 inch)	2 6
Initial: 465 mm (18.30 inch) 481 500 mm (18.94 19.68 inch)	2 7
Initial: 500 mm (19.68 inch)	21
501 550 mm (19.72 21.65 inch)	3 1
Initial: 510 mm (20.08 inch)	
551 600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch)	3 2
601 650 mm (23.66 25.59 inch)	3 3
Initial: 650 mm (25.59 inch)	

Selection and Ordering data	Article No.
SITRANS TS500	7MC751-
Pipe version for minimal to medium stress, as per thermowell DIN 43722, Type 2, without process connection, without extension, plug-in or use with moveable compression fittings	
651 700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch)	3 4
701 750 mm (27.6 29.53 inch) Initial: 750 mm (29.53 inch) 751 800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 5 3 6
801 850 mm (31.5 33.47 inch) Initial: 850 mm (33.47 inch) 851 900 mm (33.5 35.43 inch) Initial: 900 mm (35.43 inch) 901 950 mm (35.47 37.4 inch)	3 7 4 1 4 2
Initial: 950 mm (37.4 inch) 951 1 000 mm (37.44 39.37 inch)	4 3
Initial: 1 000 mm (39.37 inch) 1001 1 100 mm (39.4 43.30 inch) Initial: 1 100 mm (43.30 inch) 1 101 1 200 mm (43.35 47.24 inch)	4 4 4 5
Initial: 1 200 mm (47.24 inch) 1 201 1 300 mm (47.28 51.18 inch)	4 6
Initial: 1 300 mm (51.18 inch) 1 301 1 400 mm (51.22 55.11 inch) Initial: 1400 mm (55.11 inch) 1 401 1 500 mm (55.15 59.05 inch) Initial: 1 500 mm (59.05 inch)	4 7 5 1
Extension X Standard length for Type 2 as per DIN 43722 (without extension N=U)	0

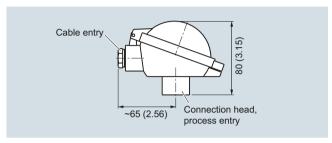
Additional configurations on page after next page! You find ordering examples on page 2/37!

SITRANS TS500

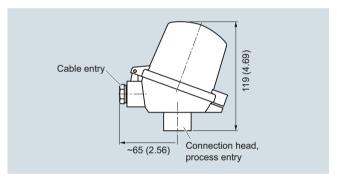
#### Type 2, tubular version without process connection



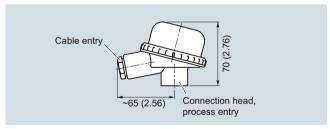
Connection head, aluminum, Type BAO, dimensions in mm (inch)



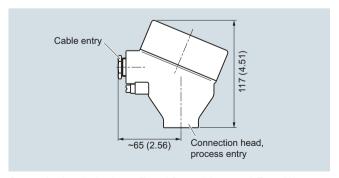
Connection head, aluminum, Type BB0, dimensions in mm (inch)

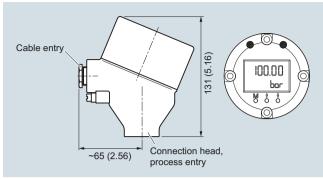


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

### Type 2, tubular version without process connection

Selection and Ordering data	Article No.	
SITRANS TS500	7MC751-	
Tubular version for minimal to medium stress, as per thermowell DIN 43722, Type 2, without process connection, without extension, plug-in or use with moveable compression fittings		
Head Aluminum head, BA0, flange cover, Standard	A	
Aluminum head, BB0, low hinged cover, screw connection	В	
Aluminum head, BC0, high hinged cover, screw connection	С	
Aluminum head, AGO, screw cover, suitable for suitable for Ex d <sup>1)</sup>	G	
Aluminum head, AH0, screw cover, suitable for Ex d, display <sup>1)</sup> Plastic head, BM0, screw cover	H M	
Plastic head, BPO, high hinged cover, screw connection	P	
Stainless steel head, AU0, screw cover, suitable for Ex d <sup>1)</sup>	U	
Stainless steel head, AVO, screw cover, suitable for Ex d, display 1)	V	
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16 Pt100, basis, -50 +400 °C		A
(-58 +752 °F) Pt100, vibration-resistant,		В
-50 +400 °C (-58 +752 °F) Pt100, expanded range, -196 +600 °C (-321 +1 112 °F)		С
Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)		K
Thermocouple Type J, -40 +750 °C (-40 +1 382 °F)		J
Thermocouple Type N, -40 +1 000 °C (-40 +1 832 °F)		N
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B) Single, increased accuracy		1 2
(Class 1/Class A) Single, highest accuracy (Class AA)		3
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy (Class 1/Class A)		6
Double, highest accuracy (Class AA)		7

 $<sup>^{1)}</sup>$  Ex d in connection with Order code E03

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44

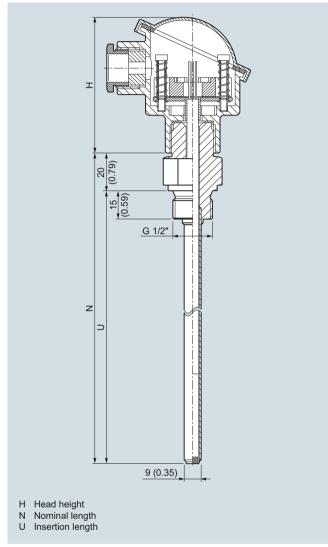
71 /	
Selection and Ordering data	Order code
Options	
Add "-Z" to Article No. and add options, separate	
extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with	
plain text data "Y01".	
SITRANS TH100, 4 20 mA, Pt100	T10
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T11
SITRANS TH200, 4 20 mA, Universal	T20
SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal	T21
SITRANS TH300, HART, Universal SITRANS TH300 Ex i (ATEX), HART, Universal	T30 T31
SITRANS TH400 PA, Universal	T40
SITRANS TH400 PA Ex i, Universal	T41
SITRANS TH400 FF, Universal	T45
SITRANS TH400 FF Ex i, Universal	T46
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of	E01
the optional transmitter) Flameproof enclosure "d"; dust protection through	E03
housing "t" only with connection heads code AGO,	L03
AH0, AU0, AV0, without cable gland (please select	
non-Ex version of the optional transmitter)	E04
Non sparking "n"	E04
Certificates and approvals	040
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate for hydrostatic	C31
pressure test	
EN10204-3.1 Inspection certificate for helium leak test	C32
EN10204-3.1 Inspection certificate for surface tear test	C33
EN10204-3.1Inspection certificate: visual, measure-	C34
ment and functional inspection	•
EN 10204-2.1: Declaration of compliance with the	C35
order	C51
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	CSI
Designation, calibration	
	Y15
Stainless steel TAG plate, enter lettering in plain text Plant calibration per 1 point, enter temperature in plain	Y33
text	
Transmitter options	
Transmitter, enter complete setting in plain text	Y01
(Y01:+/-NNNN +/-NNNN C,F), marking on the	
device when Order code "Y15" is selected	Y17
Enter measuring point (max. 8 characters) in plain text Transmitter, enter measuring point description (max.	Y23
16 characters) in plain text	120
Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text	Vac
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA)	030
Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity	C23
Transmitter test protocol (5 points)	C11
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or trans-	G12
mitter, Non-Ex)	
Harting plug Han 7 D (Non Ex, without mating connec-	G13
tor)	G20
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0 and	A02
AVO	
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03
Compression fitting G½", enclosed	A31
Compression fitting NPT½", enclosed	A32
You find ordering examples on page 2/27!	
You find ordering examples on page 2/37!	

SITRANS TS500

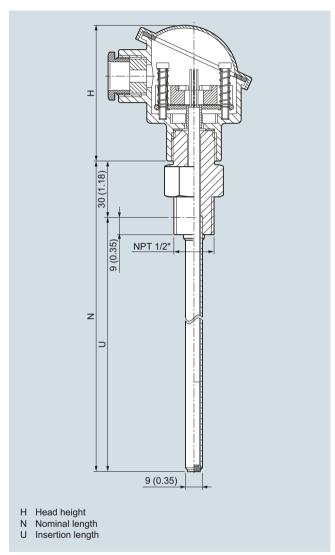
Type 2N, tubular version with screw socket

#### Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to medium stress, thermowell Type 2N similar to DIN 43722, screwed in, without extension, non-alignable connection head.



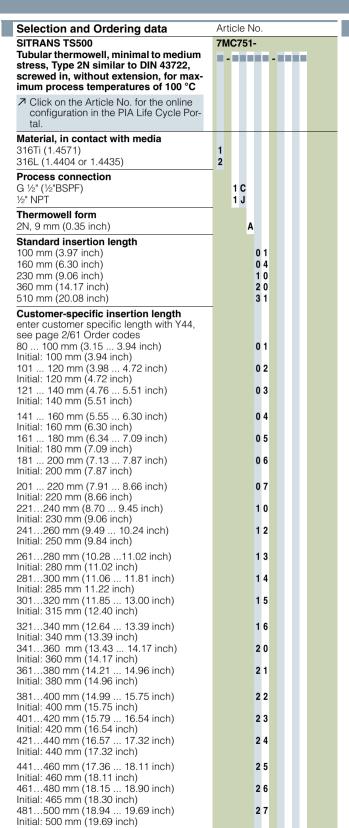
Connection type "G", dimensions in mm (inch)



Connection type "NPT", dimensions in mm (inch)

SITRANS TS500

#### Type 2N, tubular version with screw socket

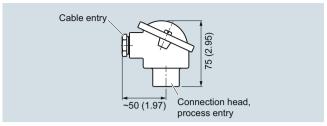


Selection and Ordering data	Article No.
SITRANS TS500	7MC751-
Tubular thermowell, minimal to medium stress, Type 2N similar to DIN 43722, screwed in, without extension, for maximum process temperatures of 100 °C	
501550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch) 551600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch)	3 1 3 2
601650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 3
651700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch) 701750 mm (27.60 29.53 inch) Initial: 750 mm (29.53 inch) 751800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 4 3 5 3 6
801850 mm (31.54 33.46 inch) Initial: 850 mm (33.46 inch) 851900 mm (33.50 35.43 inch) Initial: 900 mm (35.43 inch) 901950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	3 7 4 1 4 2
9511 000 mm (37.44 39.37 inch) Initial: 1 000 mm (39.37 inch) 1 0011 100 mm (39.41 43.31 inch) Initial: 1 100 mm (43.31 inch) 1 1011 200 mm (43.35 47.24 inch) Initial: 1 200 mm (47.24 inch)	4 3 4 4 4 5
1 2011 300 mm (47.28 51.18 inch) Initial: 1 300 mm (51.18 inch) 1 3011 400 mm (51.22 55.12 inch) Initial: 1400 mm (55.12 inch) 1 4011 500 mm (55.16 59.05 inch) Initial: 1 500 mm (59.05 inch)	4 6 4 7 5 1
Extension X without neck tube, (not adjustable)	0

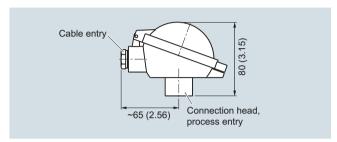
Additional configurations on page after next page!

SITRANS TS500

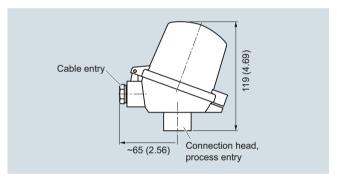
#### Type 2N, tubular version with screw socket



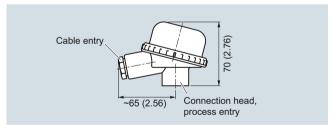
Connection head, aluminum, Type BAO, dimensions in mm (inch)



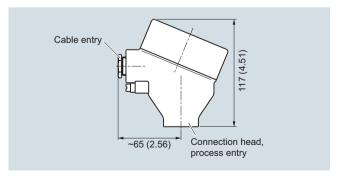
Connection head, aluminum, Type BB0, dimensions in mm (inch)

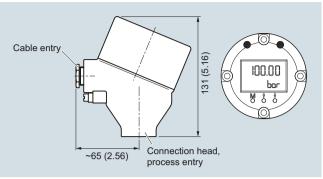


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

#### Type 2N, tubular version with screw socket

Selection and Ordering data	Article No.		
SITRANS TS500	7MC751-		
Tubular thermowell, minimal to medium stress, Type 2N similar to DIN 43722, screwed in, without extension, for maximum process temperatures of 100 °C			
Head			
Aluminum head, BA0, flange cover,	A		
Standard Aluminum head, BB0, low hinged cover,	В		
screw connection	_		
Aluminum head, BC0, high hinged cover, screw connection	C		
Aluminum head, AG0, screw cover, suitable for Ex d <sup>1)</sup>	G		
Aluminum head, AHO, screw cover, suit-	Н		
able for Ex d, display <sup>1)</sup> Plastic head, BM0, screw cover	M		
Plastic head, BP0high hinged cover,	P		
screw connection			
Stainless steel head, AU0, screw cover, suitable for Ex d <sup>1)</sup>	U		
Stainless steel head, AVO, screw cover,	v		
suitable for Ex d, display <sup>1)</sup>			
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16 Pt100, basis, -50 +400 °C		A	
(-58 +752 °F)			
Pt100, vibration-resistant, -50 +400 °C (-58 +752 °F)		В	
Pt100, expanded range, -196 +600 °C (-321 +1 112 °F)		С	
Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)		K	
Thermocouple Type J, -40 +750 °C (-40 +1 382 °F)		J	
Thermocouple Type N, -40 +1 000 °C		N	
(-40 +1 832 °F)	_		
Sensor number/Accuracy			
Single, basic accuracy (Class 2/Class B)		1	
Single, increased accuracy		2	
(Class 1/Class A)			
Single, highest accuracy (Class AA)		3	
Double, basic accuracy		5	
(Class 2/Class B)			
Double, increased accuracy (Class 1/Class A)		6	
Double, highest accuracy (Class AA)		7	

 $<sup>^{1)}</sup>$  Ex d in connection with Order code E03

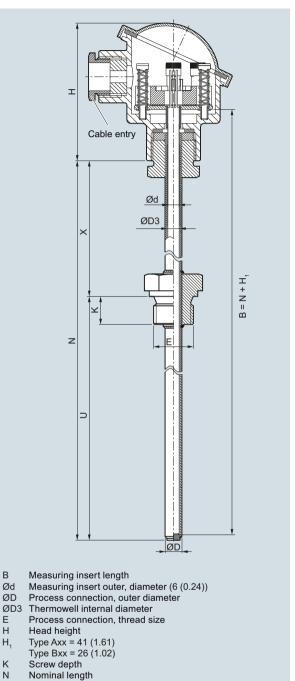
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44

Type 2N, tubular version with	screw socket
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 20 mA, Pt100 SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T10 T11 T20
SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA,Universal SITRANS TH300, HART, Universal	T21 T30
SITRANS TH300 Ex i (ATEX), HART, Universal SITRANS TH400 PA, Universal SITRANS TH400 PA Ex i, Universal	T31 T40 T41
SITRANS TH400 FF, Universal SITRANS TH400 FF Ex i, Universal	T45 T46
<b>Explosion protection</b> Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	E01
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AGO, AHO, AUO, AVO, without cable gland (please select non-Ex version of the optional transmitter)	E03
Non sparking "n"  Certificates and approvals	E04
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12 C31
EN10204-3.1 Inspection certificate for hydrostatic pressure test EN10204-3.1 Inspection certificate for helium leak	C32
test EN10204-3.1 Inspection certificate for surface tear test	C33
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	C34
EN 10204-2.1: Declaration of compliance with the order ISO 9001 grease-free (cleaned for e.g. oxygen appli-	C35
cations)	
Designation, calibration Stainless steel TAG plate, enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter options	Vod
Transmitter, enter complete setting in plain text (Y01:+/-NNNN +/-NNNN C,F), marking on the device when Order code "Y15" is selected	Y01
Enter measuring point (max. 8 characters) in plain text Transmitter, enter measuring point description (max.	Y17 Y23
16 characters) in plain text Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA) Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)  Further options	C23 C11
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	G12
Harting plug Han 7 D (Non Ex, without mating connector)  Connection head with ½" NPT thread without cable	G13 G20
gland, for AU0 and AH0 only IP66 with outer earth screw for heads AG0, AH0, AU0 and	A02
AV0 with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03
You find ordering examples on page 2/37!	

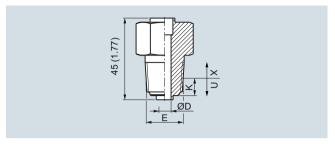
SITRANS TS500

#### Type 2G, tubular version with screw socket and extension

#### Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension, dimensions in mm (inch)



Tapered process connection, dimensions in mm (inch)

E H

 $H_{\scriptscriptstyle 1}$ 

K N U

Insertion length Extension length

SITRANS TS500

### Type 2G, tubular version with screw socket and extension

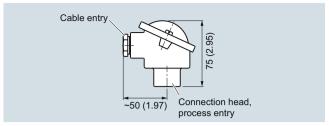
Selection and Ordering data	Article No. Ord. Code
SITRANS TS500	7MC751-
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension	
Click on the Article No. for the online configuration in the PIA Life Cycle Por- tal.	
<b>Material, in contact with media</b> 316Ti (1.4571) 316L (1.4404 or 1.4435)	1 2
Process connection Cylindrical: G½ " (½ "BSPF) Cylindrical: G1 " (1 "BSPF) Tapered: NPT½ "	1 C 1 E 1 J
Thermowell form 2G, 9 mm (0.35 inch) 2G, 12 mm (0.47 inch)	A B
Insertion length U standard 160 mm (6.30 inch) 250 mm (9.84 inch) 400 mm (15.75 inch)	0 4 1 2 2 2
Insertion length U customer-specific	
enter customer specific length with Y44, see page 2/65 Order codes 80 100 mm (3.15 3.94 inch) Initial: 100 mm (3.94 inch)	0 1
101 120 mm (3.98 4.72 inch) Initial: 120 mm (4.72 inch) 121 140 mm (4.76 5.51 inch) Initial: 140 mm (5.51 inch)	0 2 0 3
141 160 mm (5.55 6.30 inch) Initial: 160 mm (6.30 inch) 161 180 mm (6.34 7.09 inch)	0 4 0 5
181 200 mm (7.43 7.87 inch)  Initial: 200 mm (7.87 inch)	0 6
201 220 mm (7.91 8.66 inch) Initial: 220 mm (8.66 inch) 221240 mm (8.70 9.45 inch)	0 7 1 1
Initial: 225 mm (8.86 inch) 241260 mm (9.49 10.24 inch) Initial: 250 mm (9.84 inch)	1 2
261280 mm (10.2811.02 inch) Initial: 280 mm (11.02 inch) 281300 mm (11.06 11.81 inch)	1 3 1 4
Initial: 285 mm 11.22 inch) 301320 mm (11.85 13.00 inch) Initial: 315 mm (12.40 inch)	1 5
321340 mm (12.64 13.39 inch) Initial: 340 mm (13.39 inch) 341360 mm (13.43 14.17 inch) Initial: 360 mm (14.17 inch)	1 6 2 0
361380 mm (14.21 14.96 inch) Initial: 380 mm (14.96 inch)	2 1
381400 mm (14.99 15.75 inch) Initial: 400 mm (15.75 inch) 401420 mm (15.79 16.54 inch) Initial: 420 mm (16.54 inch)	2 2 2 3
421440 mm (16.57 17.32 inch) Initial: 440 mm (17.32 inch) 441460 mm (17.36 18.11 inch)	2 4 2 5
441400 mm (18.11 inch) 461480 mm (18.15 18.90 inch) Initial: 465 mm (18.30 inch)	2 6
481500 mm (18.94 19.69 inch) Initial: 500 mm (19.69 inch)	2 7

Selection and Ordering data	Article No.	Orc	d. Code
SITRANS TS500	7MC751-	Oic	ı. Code
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension	-	-	П
501550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch) 551600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch) 601650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 1 3 2 3 3		
651700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch) 701750 mm (27.60 29.53 inch) Initial: 750 mm (29.53 inch) 751800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 4 3 5 3 6		
801850 mm (31.54 33.46 inch) Initial: 850 mm (33.46 inch) 851900 mm (33.50 35.43 inch) Initial: 900 mm (35.43 inch) 901950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	3 7 4 1 4 2		
9511 000 mm (37.44 39.37 inch) Initial: 1 000 mm (39.37 inch) 1 0011 100 mm (39.41 43.31 inch) Initial: 1 100 mm (43.31 inch) 1 1011 200 mm (43.35 47.24 inch) Initial: 1 200 mm (47.24 inch)	4 3 4 4 4 5		
1 2011 300 mm (47.28 51.18 inch) Initial: 1 300 mm (51.18 inch) 1 3011 400 mm (51.22 55.12 inch) Initial: 1 400 mm (55.12 inch) 1 4011 500 mm (55.16 59.05 inch) Initial: 1 500 mm (59.05 inch)	4 6 4 7 5 1		
Extension X Standard length for Type 2G DIN 43772 (X=129 mm (5.08 inch))		1	
Extension length X - customer specific enter customer specific length with Y45, see page 2/65 Order codes 45150 mm (1.77 5.91 inch) Initial: 150 mm (5.91 inch)		9	N 1 D
151 300 mm (5.95 11.81 inch) Initial: 300 mm (11.81 inch) 301 450 mm (11.85 17.72 inch) Initial: 450 mm (17.72 inch)		9	N 2 D N 3 D

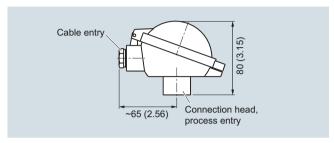
Additional configurations on page after next page! You find ordering examples on page 2/37!

SITRANS TS500

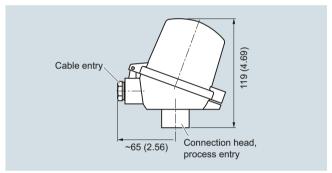
#### Type 2G, tubular version with screw socket and extension



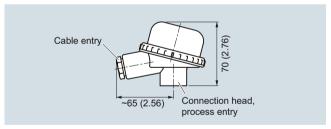
Connection head, aluminum, Type BAO, dimensions in mm (inch)



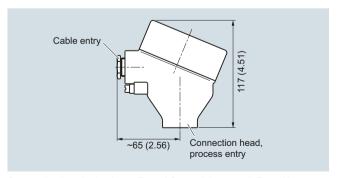
Connection head, aluminum, Type BB0, dimensions in mm (inch)

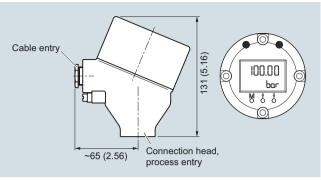


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

# Type 2G, tubular version with screw socket and extension

Solootion and Ordering data	Article No. C	rd. Code
Selection and Ordering data SITRANS TS500	7MC751-	iru. Code
Tubular thermowell, minimal to medium	7MC751-	
stress, thermowell as per DIN 43722,		
Type 2G, screwed in, with extension		
Head		
Aluminum head, BA0, flange cover, Standard	А	
Aluminum head, BB0, low hinged cover,	В	
screw connection		
Aluminum head, BC0, high hinged cover, screw connection	С	
Aluminum head, AG0, screw cover, suit-	G	
able for Ex d <sup>1)</sup>		
Aluminum head, AH0, screw cover, suitable for Ex d, display <sup>1)</sup>	Н	
Plastic head, BM0, screw cover	м	
Plastic head, BP0high hinged cover,	P	
screw connection Stainless steel head, AU0, screw cover,	U	
suitable for Ex d <sup>1)</sup>	U	
Stainless steel head, AVO, screw cover.	V	
suitable for Ex d, display <sup>1)</sup>		
Sensor		
Please note: The accuracy class range can be lower than the measuring range.		
For more information, see page 2/16		
Pt100, Basis, -50 +400 °C (-58 +752 °F)		A
Pt100, vibration resistant,		В
-50 +400 °C (-58 +752 °F)		
Pt100, expanded range, -196 +600 °C (-321 +1 112 °F)		C
Thermocouple Type K, -40 +1 000 °C		K
(-40 +1 832 °F)		
Thermocouple Type J, -40 +750 °C (-40 +1 382 °F)		J
Thermocouple Type N, -40 +1 000 °C		N
(-40 +1 832 °F)		
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy		2
(Class 1/Class A)		
Single, highest accuracy		3
(Class AA) Double, basic accuracy		5
(Class 2/Class B)		
Double, increased accuracy		6
(Class 1/Class A) Double, highest accuracy (Class AA)		7
, , ( , )		

<sup>1)</sup> Ex d in connection with Order code E03

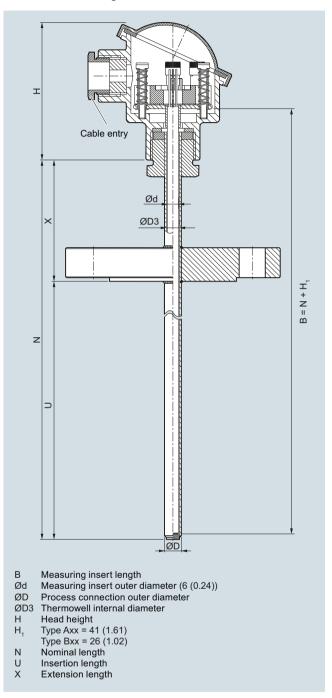
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44
Extension X length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45

la de la compania del compania del compania de la compania del compania de la compania de la compania del compania de la compania de la compania de la compania del compania	0.1
Selection and Ordering data Options	Order code
Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 20 mA, Pt100	T10
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T11
SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal	T20 T21
SITRANS TH300, HART, Universal	T30
SITRANS TH300 Ex i (ATEX), HART, Universal	T31
SITRANS TH400 PA, Universal	T40 T41
SITRANS TH400 PA Ex i, Universal SITRANS TH400 FF, Universal	T45
SITRANS TH400 FF Ex i, Universal	T46
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	E01
Flameproof enclosure "d": dust protection through	E03
housing "t" only with connection heads code AGO,	
AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	
Non sparking "n"	E04
Certificates and approvals	040
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate for hydrostatic	C31
pressure test EN10204-3.1 Inspection certificate for helium leak	C32
test	
EN10204-3.1 Inspection certificate for surface tear	C33
test EN10204-3.1 Inspection certificate: visual, measure-	C34
ment and functional inspection	
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for e.g. oxygen appli-	C51
cations)	
<b>Designation, calibration</b> Stainless steel TAG plate, enter lettering in plain text	Y15
Plant calibration per 1 point, enter temperature in	Y33
plain text	
Transmitter options Transmitter, enter complete setting in plain text	Y01
(Y01:+/-NNNN +/-NNNN C,F), marking on the	101
device when Order code "Y15" is selected	V47
Enter measuring point (max. 8 characters) in plain text	Y17
Transmitter, enter measuring point description (max.	Y23
16 characters) in plain text Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text	
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA)	030
Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C23 C11
Further options	<b>U</b>
Connection form, flying leads (for the direct transmit-	G01
ter assembly, delivery without screws and springs) M12 plug (in combination with 1x Pt100 and/or trans-	G12
mitter, Non-Ex)	GIZ
Harting plug Han 7 D (Non Ex, without mating con-	G13
nector) Connection head with ½" NPT thread without cable	G20
gland, for AU0 and AH0 only IP66	
with outer earth screw for heads AG0, AH0, AU0 and AV0	A02
with inner earth screw for heads BC0, AG0, AH0,	A03
AU0 and AV0	
You find ordering examples on page 2/37!	

SITRANS TS500

### Type 2F, tubular version with flange and extension

#### Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension, dimensions in mm (inch)

SITRANS TS500

Type 2F, tubular version with flange and extension

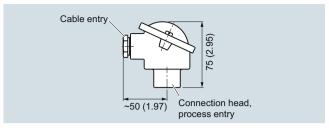
Selection and Ordering data	Art	ticl	e١	Vo		0	rd	. C	ode
SITRANS TS500		7MC751-							
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension						1	ı	i	
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	П								
Material, in contact with media					ı	Ī	Г	Ī	
316Ti (1.4571) 316L (1.4404 or 1.4435)	1 2								
Process connection Flange EN, DN 25 PN 40 B1		2	Δ						
Flange ASME, 1"RF150		2							
Flange ASME, 1"RF300		2							
Flange ASME, 1.5"RF150 Flange ASME, 1.5"RF300		2	G H						
Thermowell form	-	Ĺ	•						
2F, 9 mm (0.35 inch)			1	١					
2F, 12 mm (0.47 inch)			E	3					
Insertion U standard									
225 mm (8.86 inch) 315 mm (12.40 inch)				1					
465 mm (18.31 inch)				2					
Insertion length U customer-specific				ĺ					
enter customer specific length with Y44,									
see page 2/69 Order codes				_					
80 100 mm (3.15 3.94 inch) Initial: 100 mm (3.94 inch)				0	1				
101 120 mm (3.98 4.72 inch)				0	2				
Initial: 120 mm (4.72 inch)									
121 140 mm (4.76 5.51 inch) Initial: 140 mm (5.51 inch)				0	3				
141 160 mm (5.55 6.30 inch)				0	4				
Initial: 160 mm (6.30 inch)				ľ	1				
161 180 mm (6.34 7.09 inch)				0	5				
Initial: 180 mm (7.09 inch) 181 200 mm (7.13 7.87 inch)				0	6				
Initial: 200 mm (7.87 inch)				ľ	۱				
201 220 mm (7.91 8.66 inch)				0	7				
Initial: 220 mm (8.66 inch) 221240 mm (8.70 9.45 inch)				1	1				
Initial: 225 mm (8.86 inch)				ľ	1				
241260 mm (9.49 10.24 inch)				1	2				
Initial: 250 mm (9.84 inch)				,					
261280 mm (10.2811.02 inch) Initial: 280 mm (11.02 inch)				1	3				
281300 mm (11.06 11.81 inch)				1	4				
Initial: 285 mm 11.22 inch)					_				
301320 mm (11.85 13.00 inch) Initial: 315 mm (12.40 inch)				1	5				
321340 mm (12.64 13.39 inch)				1	6				
Initial: 340 mm (13.39 inch)									
341360 mm (13.43 14.17 inch)				2	0				
Initial: 360 mm (14.17 inch) 361380 mm (14.21 14.96 inch)				2	1				
Initial: 380 mm (14.96 inch)				ĺ					
381400 mm (14.99 15.75 inch)				2	2				
Initial: 400 mm (15.75 inch)					,				
401420 mm (15.79 16.54 inch) Initial: 420 mm (16.54 inch)				2	J				
421440 mm (16.57 17.32 inch)				2	4				
Initial: 440 mm (17.32 inch)									
441460 mm (17.36 18.11 inch)				2	5				
Initial: 460 mm (18.11 inch) 461480 mm (18.15 18.90 inch)				2	6				
Initial: 465 mm (18.30 inch)									
481500 mm (18.94 19.69 inch)				2	7				
Initial: 500 mm (19.69 inch)									

	A 11 1 NI		101
Selection and Ordering data	Article No.	Or	d. Code
SITRANS TS500 Tubular thermowell, minimal to medium	7MC751-		
stress, thermowell as per DIN 43722,			-
Type 2F, with flange, with extension			
501550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch)	3 1		
551600 mm (21.69 23.62 inch)	3 2	2	
Initial: 600 mm (23.62 inch)			
601650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 3	В	
651700 mm (25.63 27.56 inch)	3 4	ı	
Initial: 700 mm (27.56 inch)			
701750 mm (27.60 29.53 inch) Initial: 750 mm (29.53 inch)	3 5	5	
751800 mm (29.57 31.50 inch)	3 6	6	
Initial: 800 mm (31.50 inch)			
801850 mm (31.54 33.46 inch)	3 7	7	
Initial: 850 mm (33.46 inch) 851900 mm (33.50 35.43 inch)	4 1		
Initial: 900 mm (35.43 inch)			
901950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	4 2	2	
9511 000 mm (37.44 39.37 inch)	4 3	3	
Initial: 1 000 mm (39.37 inch)			
1 0011 100 mm (39.41 43.31 inch) Initial: 1 100 mm (43.31 inch)	4 4	•	
1 1011 200 mm (43.35 47.24 inch)	4 5	5	
Initial: 1 200 mm (47.24 inch) 1 2011 300 mm (47.28 51.18 inch)	4 6		
Initial: 1 300 mm (51.18 inch)			
1 3011 400 mm (51.22 55.12 inch) Initial: 1 400 mm (55.12 inch)	4 7	7	
1 4011 500 mm (55.16 59.05 inch)	5 1	ı	
Initial: 1 500 mm (59.05 inch)			
Extension X Standard length for Type 2F DIN 43772		1	
(X=64 mm (2.52 inch))			
Extension length X - customer specific			
enter customer specific length with Y45, see page 2/69 Order codes			
45150 mm (1.77 5.91 inch)		9	N 1 D
Initial: 150 mm (5.91 inch) 151 300 mm (5.95 11.81 inch)		9	N 2 D
Initial: 300 mm (11.81 inch)			
301 450 mm (11.85 17.72 inch) Initial: 450 mm (17.72 inch)		9	N 3 D
11111al. 700 11111 (17.72 111011)			

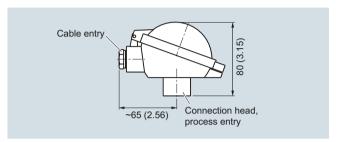
Additional configurations on page after next page! You find ordering examples on page 2/37!

SITRANS TS500

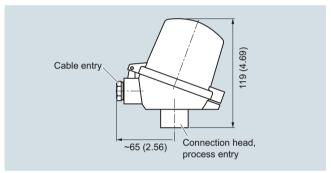
#### Type 2F, tubular version with flange and extension



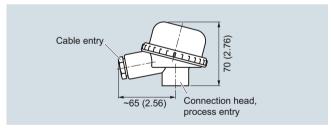
Connection head, aluminum, Type BAO, dimensions in mm (inch)



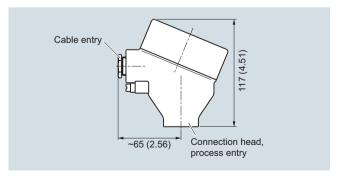
Connection head, aluminum, Type BB0, dimensions in mm (inch)

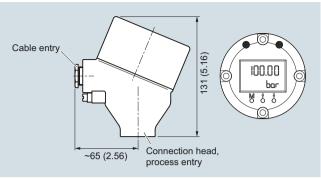


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

### Type 2F, tubular version with flange and extension

Selection and Ordering data	Article No.
SITRANS TS500	7MC751-
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension	
Head Aluminum head, BAO, flange cover, Standard Aluminum head, BBO, low hinged cover,	A B
screw connection Aluminum head, BC0, high hinged cover, screw connection Aluminum head, AG0, screw cover, suit-	c
able for Ex d <sup>1)</sup> Aluminum head, AH0, screw cover, suitable for Ex d, display <sup>1)</sup>	н
Plastic head, BM0, screw cover Plastic head, BP0high hinged cover, screw connection	M P U
Stainless steel head, AU0, screw cover, suitable for Ex d <sup>1)</sup> Stainless steel head, AV0, screw cover, suitable for Ex d, display <sup>1)</sup>	v
Sensor  Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16  Pt100, Basis, -50 +400 °C  (-58 +752 °F)  Pt100, vibration resistant, -50 +400 °C (-58 +752 °F)  Pt100, expanded range, -196 +600 °C (-321 +1 112 °F)  Thermocouple Type K, -40 +1 000 °C  (-40 +1 832 °F)  Thermocouple Type J, -40 +750 °C  (-40 +1 382 °F)  Thermocouple Type N, -40 +1 000 °C  (-40 +1 832 °F)  Sensor number/Accuracy	A B C K J
Single, basic accuracy (Class 2/Class B) Single, increased accuracy (Class 1/Class A) Single, highest accuracy (Class AA) Double, basic accuracy (Class 2/Class B) Double, increased accuracy (Class 1/Class A)	1 2 3 5 6
Double, highest accuracy (Class AA)	7

<sup>1)</sup> Ex d in connection with Order code E03

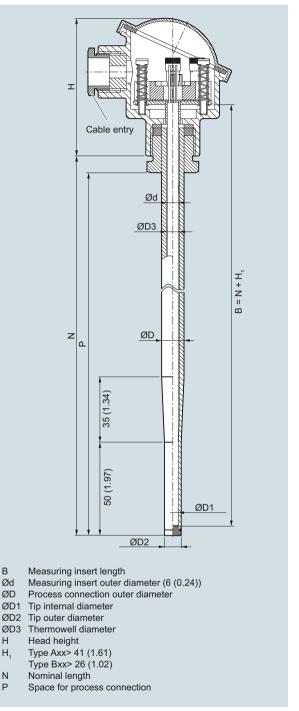
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertionlength customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44
Extension X length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45

Type 2F, tubulai version with hange a	ind extension
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y01".  SITRANS TH100, 4 20 mA, Pt100  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal SITRANS TH300, HART, Universal SITRANS TH300 Ex i (ATEX), HART, Universal SITRANS TH400 PA, Universal SITRANS TH400 PA, Universal SITRANS TH400 FF, Universal	T10 T11 T20 T21 T30 T31 T40 T41 T45 T46
Explosion protection Intrinsic safety "ia", "ic" (please select Ex i version of	E01
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AGO, AHO, AUO, AVO, without cable gland (please select non-Ex version of the optional transmitter)  Non sparking "n"	E03
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate for hydrostatic pressure test	C31
EN10204-3.1 Inspection certificate for helium leak test	C32
EN10204-3.1 Inspection certificate for surface tear test	C33
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	C34
EN 10204-2.1: Declaration of compliance with the	C35
order ISO 9001 grease-free (cleaned for e.g. oxygen applications)	C51
Designation, calibration Stainless steel TAG plate , enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter options Transmitter, enter complete setting in plain text	Y01
(Y01:-/-NNNN +/-NNNN C,F), marking on the device when Order code "Y15" is selected	
Enter measuring point (max. 8 characters) in plain text	Y17
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max. 32 characters) in plain text	Y24
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA) Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C23 C11
Further options Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	G12
Harting plug Han 7 D (Non Ex, without mating connector)	G13
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0 and	A02
AVO with inner earth screw for heads BCO, AGO, AHO, AUO and AVO	A03
You find ordering examples on page 2/37!	

SITRANS TS500

#### Type 3, tubular quick without process connection

#### Dimensional drawings



SITRANS TS500, temperature sensors for vessel and pipings, tubular version for minimum to medium stress, without process connection, without extension, plug-in or use with moveable compression fitting, dimension in mm (inch)

Ød

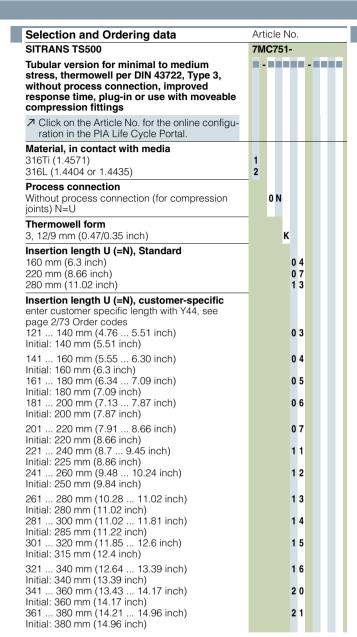
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SITRANS TS500

#### Type 3, tubular quick without process connection

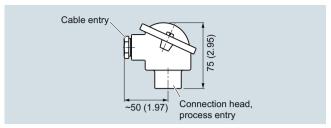


Selection and Ordering data	Article No.
SITRANS TS500	7MC751-
Tubular version for minimal to medium stress, thermowell per DIN 43722, Type 3, without process connection, improved response time, plug-in or use with moveable compression fittings	
381 400 mm (15 15.75 inch) Initial: 400 mm (15.75 inch) 401 420 mm (15.79 16.54 inch) Initial: 420 mm (16.54 inch) 421 440 mm (16.57 17.32 inch) Initial: 440 mm (17.32 inch)	2 2 2 3 2 4
441 460 mm (17.36 18.11 inch) Initial: 460 mm (18.11 inch) 461 480 mm (18.15 18.90 inch) Initial: 465 mm (18.30 inch) 481 500 mm (18.94 19.68 inch) Initial: 500 mm (19.68 inch)	2 5 2 6 2 7
501 550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch) 551 600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch) 601 650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 1 3 2 3 3
651 700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch) 701 750 mm (27.6 29.53 inch) Initial: 750 mm (29.53 inch) 751 800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 4 3 5 3 6
801 850 mm (31.53 33.46 inch) Initial: 850 mm (33.46 inch) 851 900 mm (33.50 35.43 inch) Initial: 900 mm (35.43 inch) 901 950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	3 7 4 1 4 2
951 1 000 mm (37.44 39.37 inch) Initial: 1 000 mm (39.37 inch) 1 001 1 100 mm (39.41 43.31 inch) Initial: 1 100 mm (43.31 inch)	4 4
Extension Standard length for Type 2 as per DIN 43722 (without extension N=U)	0

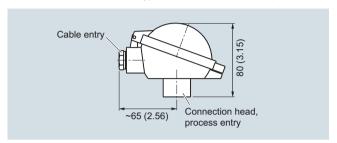
Additional configurations on page after next page!

SITRANS TS500

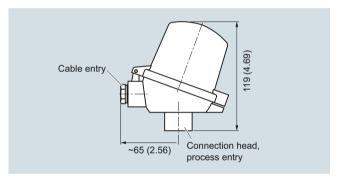
#### Type 3, tubular quick without process connection



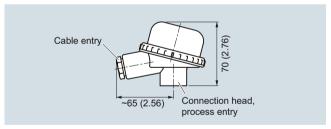
Connection head, aluminum, Type BAO, dimensions in mm (inch)



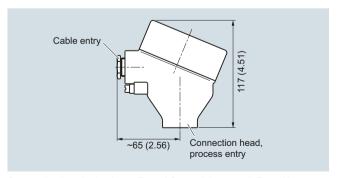
Connection head, aluminum, Type BB0, dimensions in mm (inch)

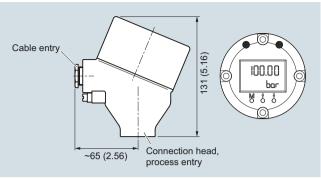


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

### Type 3, tubular quick without process connection

Salastian and Ordering data	Article No.	
Selection and Ordering data SITRANS TS500	7MC751-	
Tubular version for minimal to medium stress, thermowell as per DIN 43722, Type 3, without process connection, improved response time, plug-in or use with moveable compression fittings		
Head Aluminum head, BA0, flange cover, Standard	А	
Aluminum head, BB0, low hinged cover, screw connection	В	
Aluminum head, BC0, high hinged cover, screw connection Aluminum head, AG0, screw cover, suit-	C G	
able for Ex d <sup>1)</sup> Aluminum head, AH0, screw cover, suitable for Ex d, display <sup>1)</sup>	н	
Plastic head, BM0, screw cover Plastic head, BP0high hinged cover,	M P	
screw connection Stainless steel head, AU0, screw cover, Ex d <sup>1)</sup>	U	
Stainless steel head, AVO, screw cover, suitable for Ex d, display 1)	V	
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16 Pt100, bass, -50 +400 °C	A	
(-58 +752 °F) Pt100, vibration-resistant, -50 +400 °C (-58 +752 °F)	В	
Pt100, expanded range, -196 +600 °C (-321 +1 112 °F) Thermocouple Type J, only class 2,	J	
-40 +750 °C (-40 +1 382 °F) Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)	К	
Thermocouple Type N, -40 +1 000 °C (-40 +1 832 °F)	N	
Sensor number/Accuracy Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy (Class 1/Class A) Single, highest accuracy (Class AA)		3
Double, basic accuracy (Class 2/Class B) Double, increased accuracy		5
(Class 1/Class A) Double, highest accuracy (Class AA)		7

 $<sup>^{1)}\,</sup>$  Ex d in connection with Order code E03

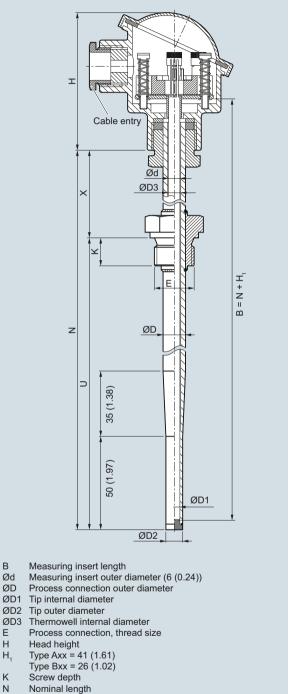
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44

Type 3, tubular quick without proces	ss connection
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 20 mA, Pt100	T10
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T11
SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal	T20 T21
SITRANS TH300, HART, Universal	T30
SITRANS TH300 Ex i (ATEX), HART, Universal	T31
SITRANS TH400 PA, Universal	T40 T41
SITRANS TH400 PA Ex i, Universal SITRANS TH400 FF, Universal	T45
SITRANS TH400 FF Ex i, Universal	T46
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of	E01
the optional transmitter) Flameproof enclosure "d"; dust protection through	E03
housing "t" only with connection heads code AGO,	
AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	
Non sparking "n"	E04
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate for hydrostatic	C31
pressure test  EN10004.3.1 Inspection contificate for helium leak	C32
EN10204-3.1 Inspection certificate for helium leak test	C32
EN10204-3.1 Inspection certificate for surface tear test	C33
EN10204-3.1 Inspection certificate: visual, measure-	C34
ment and functional inspection EN 10204-2.1: Declaration of compliance with the	C35
order	000
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	C51
Designation, calibration	
Stainless steel TAG plate, enter lettering in plain text	Y15
Plant calibration per 1 point, enter temperature in	Y33
plain text	
<b>Transmitter options</b> Transmitter, enter complete setting in plain text	Y01
(Y01:+/-NNNN +/-NNNN C,F), marking on the	
device when Order code "Y15" is selected Enter measuring point (max. 8 characters) in plain	Y17
text	***
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text	Y25
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	U36
(instead of 22.8 mA)	
Transmitter with a SIL 2 conformity Transmitter with a SIL 2/3 conformity	C20 C23
Transmitter test protocol (5 points)	C11
Further options	
Connection form, flying leads (for the direct transmit-	G01
ter assembly, delivery without screws and springs) M12 plug (in combination with 1x Pt100 and/or	G12
transmitter, Non-Ex)	
Harting plug Han 7 D (Non Ex, without mating connector)	G13
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0 and AV0	A02
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03
Compression joint G½", enclosed	A31
Compression joint NPT1/2", enclosed	A32
You find ordering examples on page 2/37!	

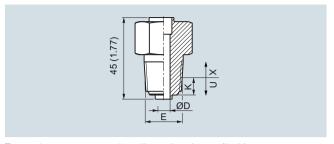
SITRANS TS500

#### Type 3G, tubular quick with screw socket and extension

#### Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension, dimensions in mm (inch)



Tapered process connection, dimensions in mm (inch)

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K N U

Insertion length Extension length

SITRANS TS500

Type 3G, tubular quick with screw socket and extension

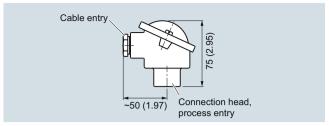
0.1	Auticle Nie	1 -	
Selection and Ordering data SITRANS TS500	Article No. Ord. Code 7MC751-		
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension			
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
<b>Material, in contact with media</b> 316Ti (1.4571) 316L (1.4404 or 1.4435)	1 2		
Process connection Cylindrical: G½" inch (½" BSPF) Cylindrical: G1" inch (1" BSPF) Tapered: NPT½"	1 C 1 E 1 J		
<b>Thermowell form</b> 3G, 12/9 mm (0.47/0.35 inch)	К		
Insertion length U standard 160 mm (6.30 inch) 220 mm (8.66 inch) 280 mm (11.02 inch)	0 4 0 7 1 3		
Insertion length U customer- specific enter customer specific length with Y44,			
see page 2/77 Order codes 121 140 mm (4.76 5.51 inch) Initial: 140 mm (5.51 inch)	0 3		
141 160 mm (5.55 6.30 inch) Initial: 160 mm (6.30 inch) 161 180 mm (6.34 7.09 inch)	0 4 0 5		
Initial: 180 mm (7.09 inch) 181 200 mm (7.13 7.87 inch) Initial: 200 mm (7.87 inch)	0 6		
201 220 mm (7.91 8.66 inch) Initial: 220 mm (8.66 inch) 221240 mm (8.70 9.45 inch)	0 7 1 1		
221240 mm (8.70 9.45 mch) Initial: 225 mm (8.86 inch) 241260 mm (9.49 10.24 inch) Initial: 250 mm (9.84 inch)	1 2		
261280 mm (10.2811.02 inch) Initial: 280 mm (11.02 inch)	13		
281300 mm (11.06 11.81 inch) Initial: 285 mm 11.22 inch) 301320 mm (11.85 13.00 inch) Initial: 315 mm (12.40 inch)	1 4 1 5		
321340 mm (12.64 13.39 inch) Initial: 340 mm (13.39 inch)	1 6		
341360 mm (13.43 14.17 inch) Initial: 360 mm (14.17 inch) 361380 mm (14.21 14.96 inch) Initial: 380 mm (14.96 inch)	2 0 2 1		
381400 mm (14.99 15.75 inch) Initial: 400 mm (15.75 inch)	2 2		
401420 mm (15.79 16.54 inch) Initial: 420 mm (16.54 inch) 421440 mm (16.57 17.32 inch) Initial: 440 mm (17.32 inch)	2 3 2 4		
441460 mm (17.36 18.11 inch) Initial: 460 mm (18.11 inch)	2 5		
461480 mm (18.15 18.90 inch) Initial: 465 mm (18.30 inch) 481500 mm (18.94 19.69 inch)	2 6 2 7		

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension	7MC751-	
501 550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch) 551 600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch) 601 650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 1 3 2 3 3	
651 700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch) 701 750 mm (27.6 29.53 inch) Initial: 750 mm (29.53 inch) 751 800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 4 3 5 3 6	
801 850 mm (31.53 33.46 inch) Initial: 850 mm (33.46 inch) 851 900 mm (33.50 35.43 inch) Initial: 900 mm (35.43 inch) 901 950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	3 7 4 1 4 2	
951 1 000 mm (37.44 39.37 inch) Initial: 1 000 mm (39.37 inch)	4 3	
Extension X Standard length for Type 2G DIN 43772 (X=131 mm (5.08 inch))		1
Extension length - customer specific enter customer specific length with Y45, see page 2/77 Order codes 55150 mm (2.17 5.91 inch) Initial: 150 mm (5.91 inch) 151 300 mm (5.95 11.81 inch) Initial: 300 mm (11.81 inch)		9 N1D 9 N2D

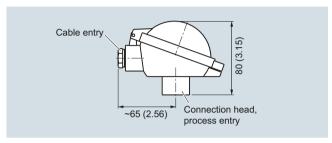
Additional configurations on page after next page! You find ordering examples on page 2/37!

SITRANS TS500

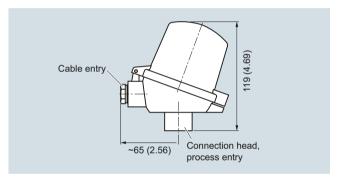
#### Type 3G, tubular quick with screw socket and extension



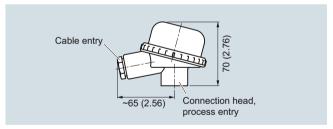
Connection head, aluminum, Type BAO, dimensions in mm (inch)



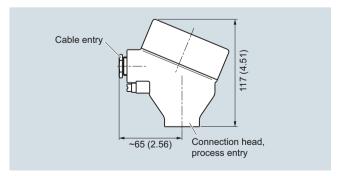
Connection head, aluminum, Type BB0, dimensions in mm (inch)

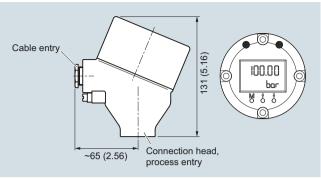


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

### Type 3G, tubular quick with screw socket and extension

Selection and Ordering data	Article No.	
SITRANS TS500	7MC751-	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension		
Head		
Aluminum head, BA0, flange cover,	Α	
Standard	5	
Aluminum head, BB0, low hinged cover, screw connection	В	
Aluminum head, BC0, high hinged cover,	С	
screw connection		
Aluminum head, AG0, screw cover, suitable for Ex d <sup>1)</sup>	G	
Aluminum head, AHO, screw cover, suitable for Ex d, display 1)	Н	
Plastic head, BM0, screw cover	M	
Plastic head, BP0high hinged cover,	P	
screw connection	U	
Stainless steel head, AU0, screw cover, Ex d <sup>1)</sup>	U	
Stainless steel head, screw cover,	V	
Ex d, display <sup>1)</sup>		
Sensor		
Please note: The accuracy class range		
can be lower than the measuring range. For more information, see page 2/16		
Pt100, basis, -50 +400 °C	A	١
(-58 +752 °F)		
Pt100, vibration resistant, -50 +400 °C	E	3
(-58 +752 °F) Pt100, expanded range,		,
-196 +600 °C (-321 1 112 °F)		
Thermocouple Type J, only class 2,		J
-40 +750 °C (-40 +1 382 °F)		,
Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)		`
Thermocouple Type N,	N	1
-40 + 000 °C (-40 +1 832 °F)		
Sensor number/Accuracy		
Single, basic accuracy		1
(Class 2/Class B) Single, increased accuracy		2
(Class 1/Class A)		-
Single, highest accuracy		3
(Class AA)		_
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy		6
(Class 1/Class A)		
Double, highest accuracy (Class AA)		7

<sup>1)</sup> Ex d in connection with Order code E03

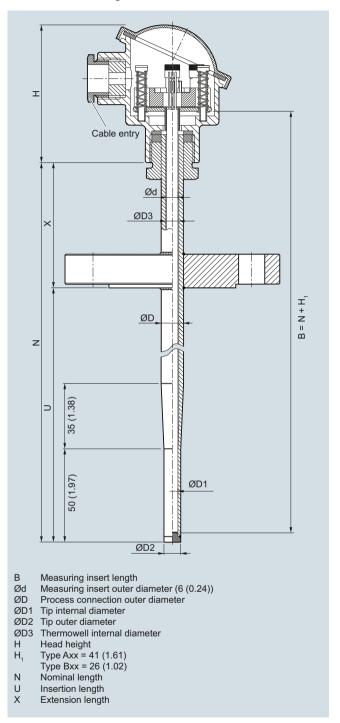
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45

Type 3G, tubulai quick with screw socket a	ind extension
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y01".  SITRANS TH100, 4 20 mA, Pt100  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal SITRANS TH300, HART, Universal SITRANS TH300 Ex i (ATEX), HART, Universal SITRANS TH400 PA, Universal SITRANS TH400 PA, Universal SITRANS TH400 PF, Universal SITRANS TH400 FF, Universal SITRANS TH400 FF, Universal SITRANS TH400 FF, Universal SITRANS TH400 FF, Universal	T10 T11 T20 T21 T30 T31 T40 T41 T45 T46
Explosion protection Intrinsic safety "ia", "ic" (please select Ex i version of	E01
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AGO, AHO, AUO, AVO, without cable gland (please select non-Ex version of the optional transmitter)  Non sparking "n"	E03
Certificates and approvals	
EN10204-3.1 Inspeciton certificate for materials coming into contact with media	C12
EN10204-3.1 Inspection certificate for hydrostatic pressure test	C31
EN10204-3.1 Inspection certificate for helium leak test	C32
EN10204-3.1 Inspection certificate for surface tear test	C33
EN10204-3.1 Inspectiont certificate: visual, measurement and functional inspection	C34
EN 10204-2.1: Declaration of compliance with the	C35
order ISO 9001 grease-free (cleaned for e.g. oxygen applications)	C51
Designation, calibration Stainless steel TAG plate , enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter options Transmitter, enter complete setting in plain text	Y01
(Y01:-/-NNNN +/-NNNN C,F), marking on the device when Order code "Y15" is selected	101
Enter measuring point (max. 8 characters) in plain text	Y17
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max. 32 characters) in plain text	Y24
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA) Transmitter with a SIL 2 conformity	C20
Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C23 C11
Further options Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	G12
Harting plug Han 7 D (Non Ex, without mating connector)	G13
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0 and AV0	A02
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03
You find ordering examples on page 2/37!	

SITRANS TS500

### Type 3F, tubular quick with flange and extension

#### Dimensional drawings



SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension, dimensions in mm (inch)

SITRANS TS500

### Type 3F, tubular quick with flange and extension

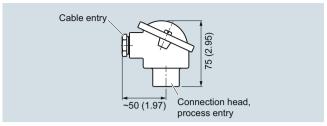
Selection and Ordering data	Ar	ticle	No	).	Ord	. Cod
SITRANS TS500	71	1C7	51-			
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension		ı	Ī	-		
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
<b>Material, in contact with media</b> 316Ti (1.4571) 316L (1.4404 or 1.4435)	1 2					
Process connection Flange EN; DN25PN40 B1 Flange ASME; 1"RF150 Flange ASME; 1"RF300 Flange ASME; 1.5"RF150 Flange ASME; 1.5"RF300		2 A 2 E 2 F 2 G 2 H				
<b>Thermowell form</b> 3F; 12/9 mm (0.47/0.35 inch)			K			
Insertion length U standard 225 mm (8.86 inch) 285 mm (11.22 inch) 345 mm (13.58 inch)			1	1 1 1 4		
Insertion length U customer-specific enter customer specific length with Y44, see page 2/81 Order codes 121 140 mm (4.76 5.51 inch)				3		
Initial: 140 mm (5.51 inch)						
141 160 mm (5.55 6.30 inch) Initial: 160 mm (6.3 inch) 161 180 mm (6.34 7.09 inch) Initial: 180 mm (7.09 inch)			(	) 4		
181 200 mm (7.13 7.87 inch) Initial: 200 mm (7.87 inch)			(	6		
201 220 mm (7.91 8.66 inch) Initial: 220 mm (8.66 inch) 221 240 mm (8.7 9.45 inch)				) 7   1		
Initial: 225 mm (8.86 inch) 241 260 mm (9.48 10.24 inch) Initial: 250 mm (9.84 inch) 261 280 mm (10.28 11.02 inch)				2		
Initial: 280 mm (11.02 inch) 281 300 mm (11.02 11.81 inch) Initial: 285 mm (11.22 inch)			1	1 4		
301 320 mm (11.85 12.6 inch) Initial: 315 mm (12.4 inch) 321 340 mm (12.64 13.39 inch)				1 6		
Initial: 340 mm (13.39 inch) 341 360 mm (13.43 14.17 inch) Initial: 345 mm (13.58 inch)			1	7		
361 380 mm (14.21 14.96 inch) Initial: 380 mm (14.96 inch) 381 400 mm (15 15.75 inch) Initial: 400 mm (15.75 inch)				2 1		
Holtial: 420 mm (15.79 16.54 inch) Initial: 420 mm (16.54 inch) 421 440 mm (16.57 17.32 inch)				2 3		
Initial: 440 mm (17.32 inch) 441 460 mm (17.36 18.11 inch) Initial: 460 mm (18.11 inch)				2 5		
461 480 mm (18.15 18.90 inch) Initial: 465 mm (18.30 inch)				2 6 2 7		
481 500 mm (18.94 19.68 inch) Initial: 500 mm (19.68 inch)			ĺ	′		

Selection and Ordering data	Article No.	Ord.	Code
SITRANS TS500	7MC751-		
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension		т	Ш
501 550 mm (19.72 21.65 inch) Initial: 510 mm (20.08 inch) 551 600 mm (21.69 23.62 inch) Initial: 600 mm (23.62 inch) 601 650 mm (23.66 25.59 inch) Initial: 650 mm (25.59 inch)	3 1 3 2 3 3		
651 700 mm (25.63 27.56 inch) Initial: 700 mm (27.56 inch) 701 750 mm (27.6 29.53 inch) Initial: 750 mm (29.53 inch) 751 800 mm (29.57 31.50 inch) Initial: 800 mm (31.50 inch)	3 4 3 5 3 6		
801 850 mm (31.53 33.46 inch) Initial: 850 mm (33.46 inch) 851 900 mm (33.50 35.43 inch) Initial: 900 mm (35.43 inch) 901 950 mm (35.47 37.40 inch) Initial: 950 mm (37.40 inch)	3 7 4 1 4 2		
951 1 000 mm (37.44 39.37 inch) Initial: 1 000 mm (39.37 inch) 1 001 1 100 mm (39.41 43.31 inch) Initial: 1 100 mm (43.31 inch)	4 3 4 4		
Extension Standard length for Type 2G DIN 43772 (X=66 mm (2.60 inch))		1	
Extension length - customer specific enter customer specific length with Y45, see page 2/81 Order codes 55150 mm (2.17 5.91 inch) Initial: 150 mm (5.95 11.81 inch) Initial: 300 mm (5.95 11.81 inch)		9 9	N 1 D N 2 D

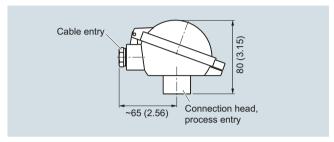
Additional configurations on page after next page!

SITRANS TS500

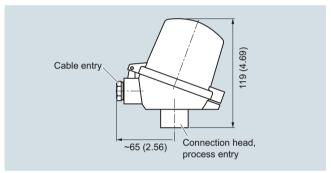
#### Type 3F, tubular quick with flange and extension



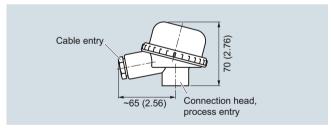
Connection head, aluminum, Type BAO, dimensions in mm (inch)



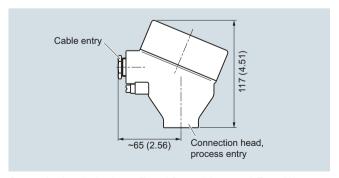
Connection head, aluminum, Type BB0, dimensions in mm (inch)

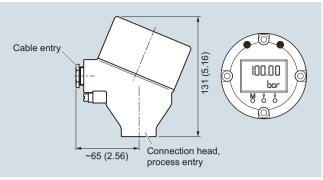


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

### Type 3F, tubular quick with flange and extension

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	7MC751-	0.0.000
Tubular thermowell, minimal to medium		
stress, thermowell as per DIN 43722,		
Type 3F, with flange, with extension		•
Head		
Aluminum head, BAO, flange cover,		Δ
Standard		
Aluminum head, BB0, low hinged cover,	1	3
screw connection		
Aluminum head, BC0, high hinged cover,		
screw connection Aluminum head, AG0, screw cover, suit-		G
able for Ex d <sup>1)</sup>	,	3
Aluminum head, AH0, screw cover, suit-		4
able for Ex d, display <sup>1)</sup>		
Plastic head, BM0, screw cover	1	И
Plastic head, BP0high hinged cover,		P
screw connection		
Stainless steel head, AU0, screw cover, Ex d <sup>1)</sup>		J
Stainless steel head, screw cover,	,	/
Ex d, display <sup>1)</sup>		
Sensor		
Please note: The accuracy class range		
can be lower than the measuring range.		
For more information, see page 2/16		
Pt100, basis, -50 +400 °C		A
(-58 +752 °F) Pt100, vibration.resistant, -50 +400 °C		В
(-58 +752 °F)		9
Pt100, expanded range,		С
-196 +600 °C (-321 +1 112 °F)		
Thermocouple Type J, only class 2,		J
-40 +750 °C (-40 +1 382 °F)		к
Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F)		K
Thermocouple Type N,		N
-40 +1 000 °C (-40 1 832 °F)		
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy		2
(Class 1/Class A)		
Single, highest accuracy (Class AA)		3
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy		6
(Class 1/Class A)		
Double, highest accuracy (Class AA)		7

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٠,	⊢x d	ın	conne	ection	with	()rder	code	+0.3

Selection and Ordering data	Order code	
Further designs		
Add "-Z" to Article No. and specify Order code.		
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44	
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45	

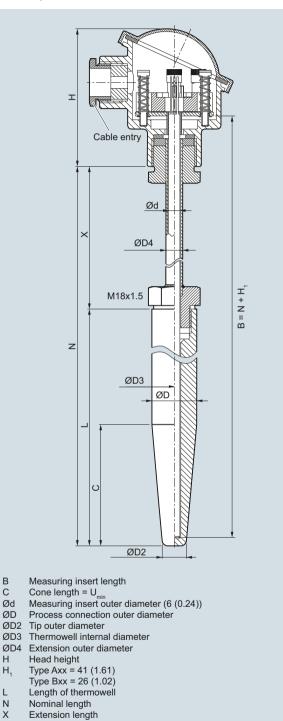
Type 3F, tubular quick with flange a	and extension
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with	
plain text data "Y01".	
SITRANS TH100, 4 20 mA, Pt100	T10
SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100	T11
SITRANS TH200, 4 20 mA, Universal	T20
SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal	T21
SITRANS TH300, HART, Universal	T30
SITRANS TH300 Ex i (ATEX), HART, Universal	T31 T40
SITRANS TH400 PA, Universal SITRANS TH400 PA Ex i, Universal	T41
SITRANS TH400 FF, Universal	T45
SITRANS TH400 FF Ex i, Universal	T46
<del></del>	
Explosion protection Intrinsic safety "ia", "ic" (please select Ex i version of	E01
the optional transmitter)	EUI
Flameproof enclosure "d"; dust protection through	E03
housing "t" only with connection heads code AG0,	
AHO, AUO, AVO, without cable gland (please select	
non-Ex version of the optional transmitter)	F04
Non sparking "n"	E04
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials	C12
coming into contact with media	C21
EN10204-3.1 Inspection certificate for hydrostatic pressure test	C31
EN10204-3.1 Inspection certificate for helium leak	C32
test	002
EN10204-3.1 Inspection certificate for surface tear	C33
test	
EN10204-3.1 Inspection certificate: visual, measure-	C34
ment and functional inspection	005
EN 10204-2.1: Declaration of compliance with the order	C35
ISO 9001 grease-free (cleaned for e.g. oxygen appli-	C51
cations)	001
Designation, calibration	
Stainless steel TAG plate, enter lettering in plain text	Y15
Plant calibration per 1 point, enter temperature in	Y33
plain text	
Transmitter options	
Transmitter, enter complete setting in plain text	Y01
(Y01:+/-NNNN +/-NNNN C,F)	
Enter measuring point (max. 8 characters) in plain	Y17
text	
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text	
Transmitter, enter bus address in plain text	Y25
Transmitter, fail-safe value 3.6 mA	U36
(instead of 22.8 mA)	000
Transmitter with a SIL 2 conformity Transmitter with a SIL 2/3 conformity	C20 C23
Transmitter test protocol (5 points)	C11
	VII
Further options Connection form, flying leads	G01
(for the direct transmitter assembly, delivery without	au i
screws and springs)	
M12 plug (in combination with 1x Pt100 and/or trans-	G12
mitter, Non-Ex)	
Harting plug Han 7 D (Non Ex, without mating con-	G13
nector)	000
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0	A02
and AVO	7.52
with inner earth screw for heads BC0, AG0, AH0,	A03
AU0 and AV0	
You find ordering examples on page 2/37!	

SITRANS TS500

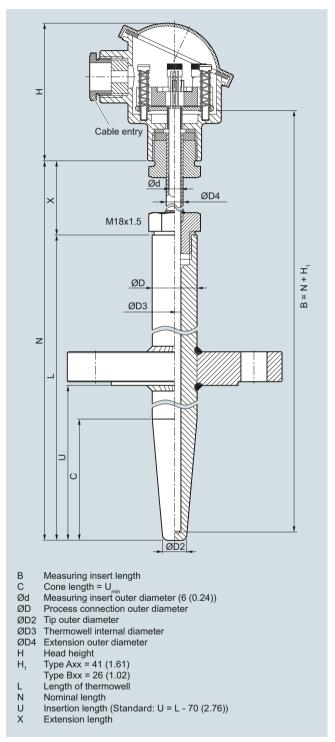
#### Type 4+4F barstock thermowell, with extension

#### Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipelines, barstock version for minimal to minimum to medium stress, thermowell as per DIN 43722.







Thermowell type 4F, with flange, with extension, dimensions in mm (inch)

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SITRANS TS500

### Type 4+4F barstock thermowell, with extension

Selection and Ordering data	Article No.	Ord, Code
SITRANS TS500	7MC752-	0.0.000
Barstock thermowell for medium to highest stress, thermowell as per DIN 43722, Type 4, for welding in, Type 4F with flange, with extension		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material, in contact with media 316Ti (1.4571) 316L (1.4404 or 1.4435) 1.7335 heat resistant, only for versions without flange 1.5415 heat resistant, only for versions without flange	1 2 3 4	
Process connection Without (for welding in) Flange DN 25 PN 40 B1 Flange 1"RF150 Flange 1"RF300 Flange 1.5"RF150 Flange 1.5"RF300	0 N 2 A 2 E 2 F 2 G 2 H	
Thermowell form  For flanged types only: specify with Y44 in plain text if insertion length "U" deviates from standard (U=L-70 mm (2.76 inch)). (Min: U = C; Max; U= L-50 mm (1.97 inch))  Type 4/4F, L=140 mm (5.51 inch), C=65 mm (3.74 inch), ØD=24 mm (0.95 inch), Ød=6 mm (0.24 inch)  Type 4/4F, L=200 mm (7.87 inch), C=65 mm (3.74 inch), ØD=24 mm (0.95 inch), Ød=6 mm (0.24 inch)  Type 4/4F, L=200 mm (7.87 inch), C=125 mm (4.92 inch), ØD=24 mm (0.95 inch), Ød=6 mm (0.24 inch)  Type 4/4F,	A 0 0 B 0 0 D 0 0	
L=260 mm (10.24 inch), C=125 mm (4.92 inch), ØD=24 mm (0.95 inch), Ød=6 mm (0.24 inch)  Extension X as per DIN 43772		,
(X=149 mm (5.87 inch))		
Extension X, customer-specific enter customer specific length with Y45, see page 2/85 Order codes 55150 mm (2.17 5.91 inch) Initial: 150 mm (5.91 inch) 151 300 mm (5.95 11.81 inch) Initial: 300 mm (11.81 inch) 301 450 mm (11.85 17.72 inch) Initial: 450 mm (17.72 inch) 451 600 mm (17.86 23.62 inch) Initial: 600 mm (23.62 inch) 601 750 mm (23.66 29.53 inch) Initial: 750 mm (29.53 inch) 751 900 mm (29.57 45.43 inch) Initial: 900 mm (45.43 inch)		9 N1D 9 N2D 9 N3D 9 N4D 9 N5D 9 N6D
901 1 050 mm (45.47 41.34 inch) Initial: 1 050 mm (41.34 inch)		9 N 7 D

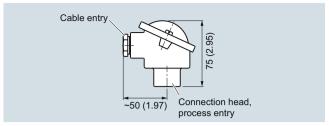
Selection and Ordering data	Article No.	Ord. Code	
SITRANS TS500	7MC752-		
Barstock thermowell for medium to highest stress, thermowell as per DIN 43722, Type 4, for welding in, Type 4F with flange, with extension			
Head Aluminum head, BA0, flange cover, Standard Aluminum head, BB0, low hinged cover, screw connection Aluminum head, BC0, high hinged cover, screw connection Aluminum head, AG0, screw cover, suit- able for Ex d Aluminum head, AH0, screw cover, suit- able for Ex d, display Plastic head, BM0, screw cover Plastic head, BP0high hinged cover, screw connection Stainless steel head, AU0, screw cover, Ex d Stainless steel head, AV0, screw cover,		A B C G H M P	
Ex d, display <sup>1)</sup> Sensor  Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16  Pt100, basis, -50 +400 °C  (-58 +752)  Pt100, vibration resistant, -50 +400 °C  (-58 +752)  Pt100, expanded range, -196 600 °C (-321 +1 112)  Thermocouple Type K, -40 +1 000 °C  (-40 +1 832)  Thermocouple Type J, only class 2, -40 +750 °C (-40 +1 382)  Thermocouple Type N, -40 +1 000 °C  (-40 +1 832)		A B C K J	
Sensor number/Accuracy Single, basic accuracy (Class 2/Class B) Single, increased accuracy (Class 1/Class A) Single, highest accuracy (Class AA) Double, basic accuracy (Class 2/Class B) Double, increased accuracy (Class 1/Class A) Double, highest accuracy (Class AA)		1 2 3 5 6	

<sup>1)</sup> Ex d in connection with Order code E03

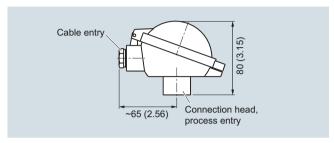
# Additional configurations on page after next page! You find ordering examples on page 2/37!

SITRANS TS500

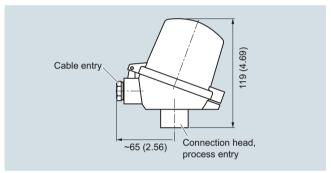
#### Type 4+4F barstock thermowell, with extension



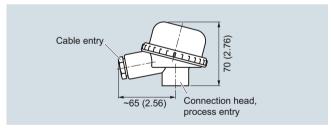
Connection head, aluminum, Type BAO, dimensions in mm (inch)



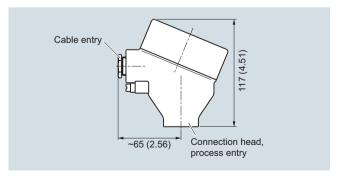
Connection head, aluminum, Type BB0, dimensions in mm (inch)

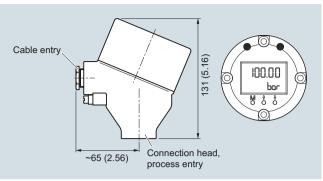


Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)





Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

# Type 4+4F barstock thermowell, with extension

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text Insertion length U deviating from standard; (Min: U = C; Max; U= L-50 mm (1.97 inch)), no entry = standard length (U=L-70 mm (2.76 inch))	Y44
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y01".  SITRANS TH100, 4 20 mA, Pt100  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i (ATEX), 4 20 mA, Universal SITRANS TH300, HART, Universal SITRANS TH300 Ex i (ATEX), HART, Universal SITRANS TH400 PA, Universal SITRANS TH400 PA, Universal SITRANS TH400 PF, Universal SITRANS TH400 FF, Universal SITRANS TH400 FF Universal SITRANS TH400 FF Universal SITRANS TH400 FF Ex i, Universal SITRANS TH400 FF Ex i, Universal	T10 T11 T20 T21 T30 T31 T40 T41 T45 T46
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter) Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AGO, AHO, AUO, AVO, without cable gland (please select non-Ex version of the optional transmitter) Non sparking "n"	E01 E03
Certificates and approvals EN10204-3.1 Inspection certificate for materials coming into contact with media EN10204-3.1 Inspection certificate for hydrostatic	C12 C31
pressure test EN10204-3.1 Inspection certificate for helium leak test EN10204-3.1 Inspection certificate for surface tear	C32 C33
EN10204-3.1 Inspection certificate for surface tear test EN10204-3.1 Inspection certificate: visual, measurement and functional inspection EN 10204-2.1: Declaration of compliance with the order	C34 C35
NACE Standard MR-01-75 compliance ISO 9001 grease-free (cleaned for e.g. oxygen applications)	C50 C51

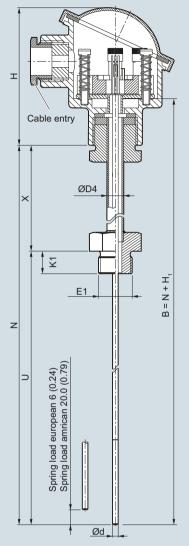
Selection and Ordering data	Order code
<b>Designation, calibration</b> Stainless steel TAG plate , enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter options Transmitter, enter complete setting in plain text (Y01:+/-NNNN +/-NNNN C,F), marking on the device when Order code "Y15" is selected	Y01
Enter measuring point (max. 8 characters) in plain	Y17
text Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max. 32 characters) in plain text	Y24
Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	Y25 U36
Transmitter with a SIL 2 conformity Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C20 C23 C11
Further options Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	G12
Harting plug Han 7 D (Non Ex, without mating connector)	G13
Connection head with ½ NPT thread without cable gland, for AU0 and AH0 only IP66 with outer earth screw for heads AG0, AH0, AU0 and	G20 A02
AVO	AUZ
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03

# You find ordering examples on page 2/37!

SITRANS TS500

### For the installation of existing protective tubes

### Dimensional drawings



Measuring insert length Measuring insert outer diameter Extension outer diameter Ød

ØD4

Process connection, thread size E1

Head height

Type Axx = 41 (1.61)Type Bxx = 26 (1.02)

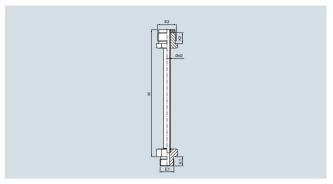
K1 Screw depth

Ν Nominal length

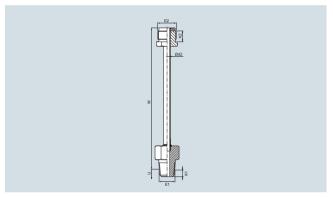
U Insertion length Extension length

Recommended rebound = inside length of the protective tube + 3 (0.12)

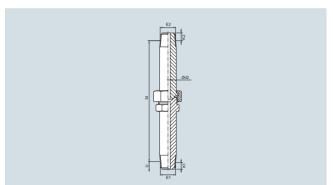
SITRANS TS500, temperature sensors for vessels and pipings, temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types, dimensions in mm (inch)



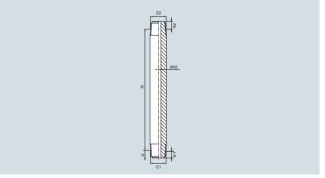
Neck tube (1, 2, 3), ajustable, european, cylindrical, dimensions in mm (inch)



Neck tube NPT (1, 2, 3), ajustable, european, conical, dimensions in mm (inch)



Neck tube NUN, ajustable, conical, european (5), american (8), dimensions in mm (inch)



Neck tube, nipple, non ajustable, conical, european (4), american (6), dimensions in mm (inch)

<sup>1)</sup> Numerics 1 ... 8: s. Selection and Ordering data option extension page 2/87

SITRANS TS500

# For the installation of existing protective tubes

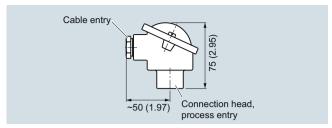
Selection and Ordering data	Article No. Ord. Co
SITRANS TS500	7MC7500-
Temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types	******
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Model existing thermowells	1
Thread type	
G½" (½"BSPF) (not for American type)	C
NPT½"	J
M14x1.5 (not for American type) M18x1.5 (not for American type)	T U
Insertion ength U free length, standard	
lengths	5.4
110 mm (4.33 inch) 140 mm (5.51 inch)	B 1 B 2
200 mm (7.87 inch)	C 1
260 mm (10.24 inch)	C 2
410 mm (16.14 inch)	E1
Insertion U free length, customer-specific	
enter customer specific length with Y44, see page 2/89 Order codes	
10 100 mm (0.39 3.94 inch)	A 0
Initial: 100 mm (3.94 inch)	
101 200 mm (3.98 7.87 inch)	B 0
Initial: 200 mm (7.87 inch) 201 300 mm (7.91 11.81 inch)	C O
Initial: 300 mm (11.81 inch)	
301 400 mm (11.85 15.75 inch)	D 0
Initial: 400 mm (15.75 inch) 401 500 mm (15.79 19.68 inch)	E O
Initial: 500 mm (19.68 inch)	
501 600 mm (19.72 23.62 inch)	F 0
Initial: 600 mm (23.62 inch) 601 800 mm (23.66 31.50 inch)	G 0
lnitial: 800 mm (31.50 inch)	G U
801 1 000 mm (31.54 39.37 inch)	H 0
Initial: 1 000 mm (39.37 inch)	
1 001 1 250 mm (39.41 49.21 inch) Initial: 1 250 mm (49.21 inch)	J 0
1 251 1 500 mm (49.25 59.05 inch)	K 0
Initial: 1 500 mm (59.05 inch)	
Measurement tip diameter	
6 mm (0.24 inch) 8 mm (0.31 inch) (with sleeve)	6 8
10 mm (0.39 inch) (with sleeve)	Ö

Selection and Ordering data	Article No.	Ord.	Code
SITRANS TS500 Temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types	7MC7500-		T
Extension X  European type: X=65 (M=80 mm) (3.15 inch) adjustable  European type: X=139 mm (5.47 inch) (M=155 mm (6.10 inch)) adjustable	1 2		
(M=155 mm (6.16 mm) adjustable (DIN standard length for L=110) European type: X=149 mm (5.87 inch) (M=165 mm (6.50 inch)) adjustable European type:NIP, =150 mm (5.91 inch)	3		
not adjustable (NPT½") European type: X=150 mm (5.91 inch) NUN adjustable (NPT½")	5		
American type: X=74 mm (2.91 inch) integrated sensor spring, NIP, not adjustable (NPT½")  American type: X=150 mm (5.91 inch) integrated sensor spring NUN adjustable	8		
(NPT½")  Extension X, customer-specific enter customer specific length with Y45, see page 2/89 Order codes 55150 mm (2.17 5.91 inch)	9		N 1
Standard: 150 mm (5.91 inch) 151 300 mm (5.95 11.81 inch) Standard: 300 mm (11.81 inch) 301 450 mm (11.85 17.72 inch) Standard: 450 mm (17.72 inch)	9		N 2 N 3
Model European type (M24 adjustable)			D

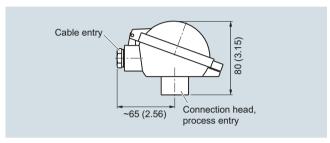
Additional configurations on page after next page! You find ordering examples on page 2/37!

### SITRANS TS500

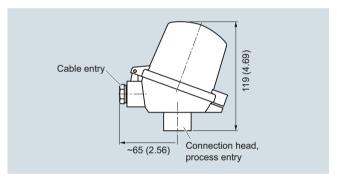
### For the installation of existing protective tubes



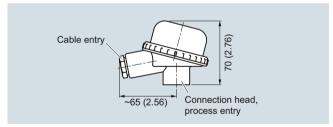
Connection head, aluminum, Type BAO, dimensions in mm (inch)



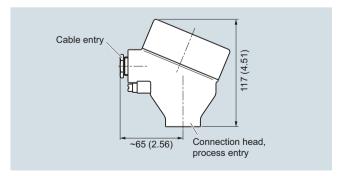
Connection head, aluminum, Type BB0, dimensions in mm (inch)



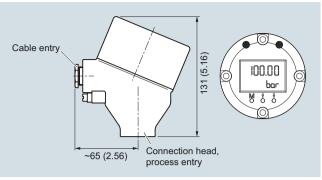
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

SITRANS TS500

# For the installation of existing protective tubes

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 Temperature sensors for installation in	7MC7500-	
existing thermowells, suitable for ther- mowells as per DIN 43772 as well as ASME		
B40.9-2001 with extension European or		
American types		
Head Aluminum head, BAO, flange cover,		Α
Standard		
Aluminum head, BB0, low hinged cover, screw connection		В
Aluminum head, BC0, high hinged cover, screw connection		С
Aluminum head, AG0, screw cover, suitable for Ex d <sup>1)</sup>		G
Aluminum head, AH0, screw cover, suitable for Ex d, display <sup>1)</sup>		H
Plastic head, BM0, screw cover Plastic head, BP0high hinged cover, screw connection		M P
Stainless steel head, AU0, screw cover, Ex d <sup>1)</sup>		U
Stainless steel head, AV0, screw cover, Ex d, display <sup>1)</sup>		v
Sensor		
Please note: The accuracy class range can be lower than the measuring range. For more		
information, see page 2/16		
Pt100, Basis, -50 +400 °C (-58 +752 °F)		A
Pt100, vibration resistant, -50 +400 °C		В
(-58 +752 °F) Pt100, expanded range,		С
-196 +600 °C (-321 +1 112 °F)		
Thermocouple Type J, only class 2, -40 +750 °C (-40 +1 382 °F)		J
Thermocouple Type K, -40 +1 000 °C		K
(-40 +1 832 °F) Thermocouple Type N, -40 +1 000 °C (-40 +1 832 °F)		N
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy		2
(Class 1/Class A) Single, highest accuracy		3
(Class AA)		
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy		6
(Class 1/Class A) Double, highest accuracy (Class AA)		7
1) Ex d in connection with Order code E03		

Selection and Ordering data	Order code
Further designs	

- u.	
Add "-Z" to Article No. and specify Order code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y45

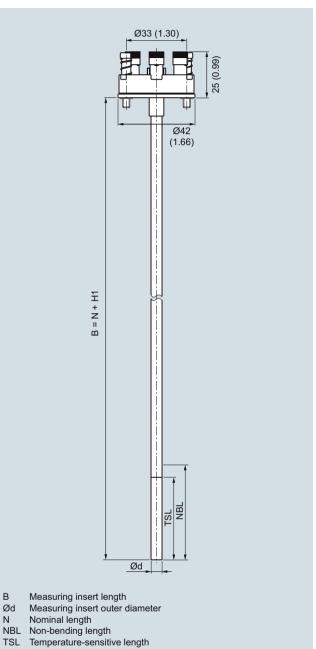
31.	
Selection and Ordering data	Order code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
	T10 T11 T20 T21 T30 T31 T40 T41 T45 T46 E01
Non sparking "n"	E04
Certificates and approvals EN10204-3.1 Factory certificate: visual, measure-	C34
ment and functional inspection EN 10204-2.1: Declaration of compliance with the order	C35
Designation, calibration Stainless steel TAG plate , enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter options Transmitter, enter complete setting in plain text (Y01:+/-NNNN +/-NNNN C,F), marking on the device when Order code "Y15" is selected	Y01
Enter measuring point (max. 8 characters) in plain text	Y17
Transmitter, enter measuring point description (max. 16 characters) in plain text	Y23
Transmitter, enter measuring point text (max.	Y24
32 characters) in plain text Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA	Y25 U36
(instead of 22.8 mA) Transmitter with a SIL 2 conformity Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C20 C23 C11
Further options Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	G01
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	G12
Harting plug Han 7 D (Non Ex, without mating connector)	G13
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	G20
with outer earth screw for heads AG0, AH0, AU0 and AV0	A02
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	A03

# You find ordering examples on page 2/37!

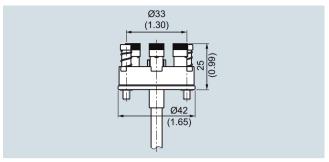
SITRANS TSinsert

### Measuring inserts for retrofits and upgrades European and American type

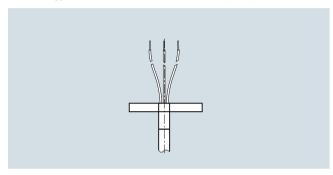
### Dimensional drawings



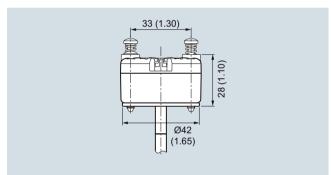
SITRANS TSinsert measuring inserts for temperature sensors, replaceable, mineral-insulated design European type (DIN ceramic base), spring load approx. 8 mm (0.31 inch) Cold End types: see drawings on right side, dimensions in mm (inch)



Cold End type, ceramic base, dimensions in mm (inch)



Cold End type, free wire ends, dimensions in mm (inch)



Cold End type, built-on transmitter, dimensions in mm (inch)

В

Ød

SITRANS TSinsert

# Measuring inserts for retrofits and upgrades European and American type

Calcation and Ordenium date	Autiala Na	
Selection and Ordering data	Article No.	
SITRANS TSinsert for temperature sen- sors, replaceable, mineral-insulated design, European or American type	7MC701	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measurement tip diameter		
6 mm (0.24 inch) 8 mm (0.31 inch) (with sleeve) 10 mm (0.39 inch) (with sleeve)	6 8 0	
Type European type - DIN ceramic base European type - DIN flying leads, absolutely necessary with built-on transmitter American type - ANSI (nipple spring)	1 2 5	
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/16 Pt100, basis, -50 +400 °C (-58 +752 °F) Pt100, vibration-resistant, -50 +400 °C (-58 +752 °F) Pt100, expanded range, -196 +600 °C (-321 +1 112 °F) Thermocouple Type J, -40 +750 °C (-40 1 382 °F) Thermocouple Type K, -40 +1 000 °C (-40 +1 832 °F) Thermocouple Type N, -40 1 +000 °C (-40 +1 832 °F)	A B C J K N	
Sensor number/Accuracy Single, basic accuracy	A	
(Class 2/Class B) Single, increased accuracy	В	
(Class 1/Class A) Single, highest accuracy	С	
(Class AA) Double, basic accuracy	D	
(Class 2/Class B) Double, increased accuracy (Class 1/Class A)	E	
Double, highest accuracy (Class AA)	F	
Measuring insert length B, standard 145 mm (6.89 inch) 205 mm (8.07 inch) 275 mm (10.83 inch) 315 mm (12.40 inch) 345 mm (13.58 inch) 375 mm (14.76 inch) 405 mm (15.94 inch) 435 mm (17.13 inch) 555 mm (21.85 inch) 585 mm (23.03 inch)	13 17 21 23 24 25 27 20 35	

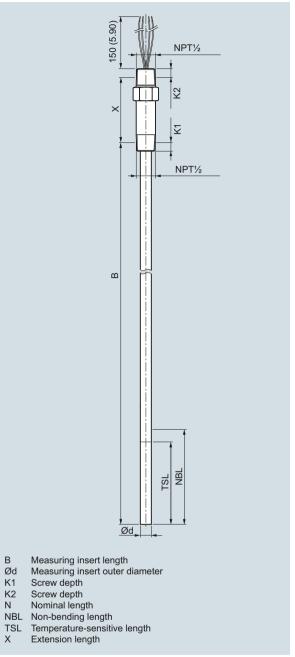
Selection and Ordering data	Article No.
SITRANS TSinsert for temperature sensors, replaceable, mineral-insulated design, European or American type	7MC701
Measuring insert length B, customer-spe-	
cific specify length with Y44, s. page 2/95	
50 100 mm (1.97 3.94 inch)	11
Initial: 100 mm (3.94 inch)	
101 150 mm (3.98 5.91 inch)	1 3
Initial: 145 mm (5.71 inch)	
151 200 mm (5.95 7.87 inch)	1 5
Initial: 200 mm (7.87 inch)	
201 250 mm (7.91 9.84 inch)	17
Initial: 205 mm (8.07 inch) 251 300 mm (9.88 11.81 inch)	2 1
Initial: 275 mm (10.83 inch)	2 1
301 350 mm (11.85 13.78 inch)	2 3
Initial: 315 mm (12.40 inch)	
351 400 mm (13.82 15.75 inch)	2 5
Initial: 375 mm (14.76 inch)	
401 450 mm (15.79 17.72 inch)	2 7
Initial: 405 mm (15.94 inch)	
451 500 mm (17.76 19.68 inch)	3 1
Initial: 500 mm (19.68 inch) 501 550 mm (19.72 21.65 inch)	3 3
Initial: 525 mm (20.67 inch)	33
551 600 mm (21.69 23.92 inch)	3 5
Initial: 555 mm (21.85 inch)	11
601 700 mm (23.66 27.56 inch)	3 7
Initial: 655 mm (25.79 inch)	
701 800 mm (27.60 31.50 inch)	4 1
Initial: 735 mm (28.94 inch)	
801 900 mm (31.54 35.43 inch)	4 3
Initial: 825 mm (32.48 inch)	4 5
901 1 000 mm (35.47 39.37 inch) Initial: 950 mm (37.40 inch)	4 3
1 001 1 500 mm (39.41 59.05 inch)	4 7
Initial: 1 250 mm (49.21 inch)	
1 501 1 700 mm (59.09 66.93 inch)	4 8
Initial: 1 700 mm (66.93 inch)	

Additional configurations on page after next page!

You find ordering examples on page 2/37!

SITRANS TSinsert

# Measuring inserts for retrofits and upgrades European and American type



SITRANS TSinsert, measuring inserts for temperature sensors, replaceable, mineral-insulated design
American type, spring load approx. 21 mm (0.83 inch)

K1

K2

Screw depth

Screw depth

SITRANS TSinsert

# Measuring inserts for retrofits and upgrades European and American type

	0 1 1
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
Measuring insert length B Select range, enter desired length in plain text (No entry = standard length)	Y44
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter  Measuring range to be set must be specified with plain text data "Y01".  SITRANS TH100, 4 20 mA, Pt100  SITRANS TH100 Ex i (ATEX), 4 20 mA, Pt100  SITRANS TH200, 4 20 mA, Universal SITRANS TH200 Ex i(ATEX), 4 20 mA, Universal SITRANS TH300, HART, Universal SITRANS TH300 Ex i (ATEX), HART, Universal SITRANS TH400 PA, Universal SITRANS TH400 PA, Universal SITRANS TH400 PF, Universal SITRANS TH400 FF Universal SITRANS TH400 FF Universal SITRANS TH400 FF Universal SITRANS TH400 FF Ex i, Universal	T10 T11 T20 T21 T30 T31 T40 T41 T45 T46
Explosion protection	<del>-</del>
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter) Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AGO, AHO, AUO, AVO, without cable gland (please select non-Ex version of the optional transmitter) for SITRANS TS500 with protection type Ex n	E01 E03
Designation, calibration Stainless steel TAG plate , enter lettering in plain text Plant calibration per 1 point, enter temperature in plain text	Y15 Y33
Transmitter, enter complete setting in plain text (Y01:+/-NNNN +/-NNNN C,F) Enter measuring point (max. 8 characters) in plain text Transmitter, enter measuring point description (max. 16 characters) in plain text Transmitter, enter measuring point text (max. 32 characters) in plain text Transmitter, enter bus address in plain text Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	Y01 Y17 Y23 Y24 Y25 U36
Transmitter with a SIL 2 conformity Transmitter with a SIL 2/3 conformity Transmitter test protocol (5 points)	C20 C23 C11

You find ordering examples on page 2/37!

Resistance thermometers

### Temperature transmitters for mounting in the connection head

### Overview



The following temperature transmitters are available for mounting in the connection head:

#### SITRANS TH100

Programmable two-wire temperature transmitter (4 to 20 mA), without electrical isolation, only for Pt100 resistance thermometers

#### SITRANS TH200

Programmable two-wire temperature transmitter (4 to 20 mA), electrical isolation for resistance thermometers and thermocouple elements.

### SITRANS TH300

Two-wire temperature transmitter with HART communication (4 to 20 mA), electrical isolation for resistance thermometers and thermocouple elements.

#### SITRANS TH400

Temperature transmitter with PROFIBUS PA or FOUNDATION Fieldbus connection, electrical isolation for resistance thermometers and thermocouple elements.

#### Note:

- SITRANS TH100/TH200/TH300/TH400 can be fitted instead of the terminal block or in the high hinged cover. Additional fitting only possible in high hinged cover.
- If using intrinsically-safe temperature sensors any installed temperature transmitters must also be intrinsically-safe.

### Selection and Ordering Data

Detailed information on the transmitters can be found for the respective products under "Transmitters for temperature".

Transmitter to be fitted	Order code
To order the sensor with a built-in temperature transmitter, add "-Z" to the Article No. of the sensor, and supplement by the following Order code:	
SITRANS TH100, only for Pt100	
• Without Ex	T10
• EEx ia IIC and EEx n for zone 2	T11
• FM	T13
SITRANS TH200	
• Without Ex	T20
• EEx ia IIC and EEx n for zone 2	T21
• FM (IS, I, NI)	T23
SITRANS TH300	
• Without Ex	T30
• EEx ia IIC and EEx n for zone 2	T31
• FM (IS, I, NI)	T33
SITRANS TH400 PA	
• Without Ex	T40
• EEx ia	T41
SITRANS TH400 FF	
• Without Ex	T45
• EEx ia	T46
Customer-specific setting of the built-in transmitter (specify set- tings in plain text)	Y11

Resistance thermometers

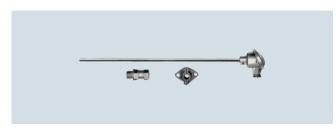
Questionnaire for temperature sensors (resistance thermometers and thermocouples)

Ge	eneral information			
Cı	ustomer:			
Address:  Contact partner:				
Pu	rchasing dept:	Tel.:		
Sa	ales dept.:			
Pro	ocess dept.:	Tel.:		
Ind	quiry:			
Qι	uotation:			
Pla	ace and date:			
Or	perating conditions	Miscellaneous		
1.		Please additionally provide the following: rough sketch, tion diagram, section of drawing, photo	installa	
2.	Location:	Sensor design		
	(e.g. pipe bend, tank)	1. Measuring element		
3.	Mounting position: (e.g. vertical, 45° against flow)	(type and standard) (e.g. Pt100 or TC type K)		
4		1.1. Tolerance:		
4.	Temperature (measuring point):  Operating temperature:	1.2. Design:		
	Temperature range:	(e.g. Pt100 or 2, 3 or 4-wire system)		
5.	Medium:	1.3. Degree of protection/type of protection:		
6.	Pressure:	2. Protective fitting:		
	Nominal pressure:	2.1. Protective tube:		
	Operating pressure:	(dimensions/material)		
7.	Flow:	2.2. Mounting:		
8.	Vibrations:	(dimensions/material)		
9.	Miscellaneous:	2.3. Neck tube:(dimensions/material)		
	(e.g. vessel or pipe materials, PTFE lining)	2.4. Mounting length/nominal length:		
Ar	nbient conditions	Material certificates:		
(e.	.g. seawater atmosphere, chemical plant)	Connection:		
De	efinition:			
		4.1. Connection head/box:		
		4.2. Cable: (dimensions/insulation/standard)		
Sp	pecial information	4.3. Other:		
1.				
		5. Tests:		
2.	Packaging regulations:	6. Accessories:		
		7. Supplementary requirements:		

Resistance thermometers

### Flue gas resistance thermometers with connection head

### Overview



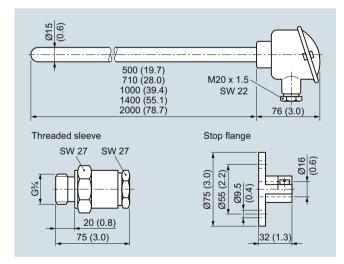
The flue gas resistance thermometer with connection head is suitable for the temperature range from -50 to +600  $^{\circ}$ C (-58 to +1112  $^{\circ}$ F) and can also be supplied with a built-in temperature transmitter.

Please order mounting flange or threaded sleeve separately.

### Technical specifications

Design	According to DIN 43764: Thermometer without mount
Protective tube	
• Form	1, DIN 43772; cylindrical, 15 mm diameter (0.59 inch), wall thick- ness 3 mm (0.12 inch), seamless
Material	St 35.8, mat. No. 1.0305, enamelled
Loading capacity	1 bar (14.5 psi) above atmospheric, to DIN 43772
Measuring insert	Replaceable, with measuring insert tube (8 mm diameter (0.31 inch)) made of stainless steel; terminal block with clamping springs

### Dimensional drawings



Flue gas resistance thermometer with connection head, dimensions in  $\operatorname{mm} \left(\operatorname{inches}\right)$ 

Selection and Ordering data	Article No.
Flue gas resistance thermometer	
Measuring resistor (winding) embedded in ceramic 1 Pt100 measuring resistor, three-wire circuit	
Mounting length/ Weight/ mm (inch): kg (lb):  • 500 (19.7) 0.9 (1.98)  • 710 (28.0) 1.1 (2.43)  • 1000 (39.4) 1.5 (3.31)  • 1400 (55.1) 1.9 (4.19)  • 2000 (78.7) 2.7 (5.95)  ✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MC1000 - 1BA2 7MC1000 - 2BA2 7MC1000 - 3BA2 7MC1000 - 4BA2 7MC1000 - 5BA2
Connection head, form B,	
made of cast light alloy, with 1 cable inlet and • Screw cover • Standard hinged cover • High hinged cover	1 4 6
Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.	Order code
Special version, specify in plain text	Y98
Process number for special version	Y99
TAG plate made of stainless steel specify TAG No. in plain text	Y15
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points). If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y11 addition is always required.	Y33
Accessories	Article No.
Mounting flange Adjustable, to DIN 43734; Material: GTW 35, mat. No. 0.8035, for protective tube diameter 15 mm (0.59 inch), 0.3 kg (0.66 lb)	7MC2998 - 5CA
Gas-tight threaded sleeve Material: 9 SMnPb 28 Material No. 1.0718, for protective tube diameter 15 mm (0.59 inch), 0.4 kg (0.88 lb)	
Given the Given Birth and Francisco Given B	7MC2998 - 5DA 7MC2998 - 5DC

To order a temperature transmitter installed in the connection head and transmitters for SIL applications, see "Temperature transmitters for mounting in the connection head" (page 2/94).

Individual parts: Measuring inserts, see "Accessories".on page 2/98

Resistance thermometers

### Resistance thermometers for damp rooms

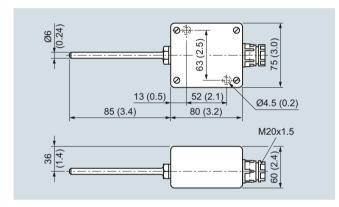
# Overview

The resistance thermometer for damp rooms is suitable for a temperature range from -30 to +60  $^{\circ}\text{C}$  (-22 to +140  $^{\circ}\text{F}).$ 

### Technical specifications

Protective tube	Made of stainless steel
Connection head	Made of cast light alloy, with cable bushing; made of plastic on request
Measuring insert	1 or 2 Pt measuring resistors to DIN EN 60751, connection in three-wire or two-wire system, class B
Degree of protection	IP65 acc. to DIN EN 60529

### Dimensional drawings



Resistance thermometer for damp rooms, dimensions in mm (inches)

Selection and Ordering data	Article No.
Resistance thermometer for damp rooms stainless steel protective tube	
<ul> <li>with one Pt100 measuring resistor 0.1 kg (0.22 kg)</li> <li>with two Pt100 measuring resistors 0.1 kg (0.22 kg)</li> </ul>	7MC1027-1AA 7MC1027-1AB
Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.	Order code
Special version, specify in plain text	Y98
Process number for special version	Y99
TAG plate made of stainless steel specify TAG No. in plain text	Y15
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points). If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y11 addition is always required.	Y33

Available ex stock

To order a temperature transmitter installed in the connection head and transmitters for SIL applications, see "Temperature transmitters for mounting in the connection head" (page 2/94).

#### Note:

Additional fitting of head mounted transmitter of SITRANS TH series is possible.

Resistance thermometers

Accessories - Welding-type protective tubes, neck tubes and connection heads

### Welding-type protective tube

#### Welding-type protective tube for high-pressure resistance thermometers to DIN 43 767, without neck tube, without connection head

- Tapered shank with cylindrical welding stubs
- For measuring insert tube with 6 mm (0.24 inch)
- OD female thread M18 x 1.5 (including steel screw plug)

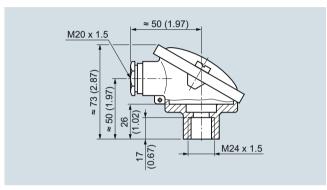
### Neck tube

### Neck tube for high-pressure screw-in resistance thermometer

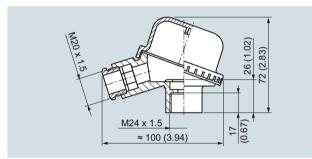
- Made of stainless steel, mat. No. 1.4571
- With threads at both ends
- For measuring insert tube with 6 mm (0.24 inch) OD

#### Dimensional drawings

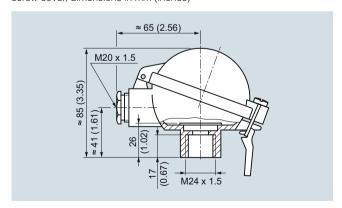
### Connection heads for low and high-pressure resistance thermometers, flue gas and flange-type resistance thermometers



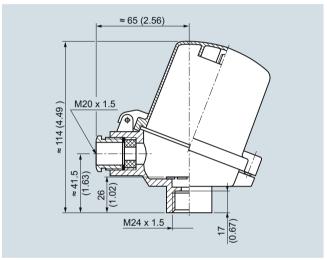
Connection head, form B, degree of protection IP54, made of cast light alloy, with screw cover, dimensions in mm (inches)



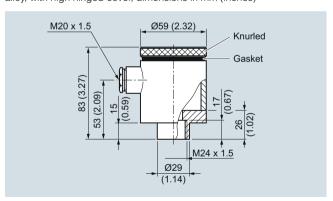
Connection head, form B, degree of protection IP54, made of plastic, with screw cover, dimensions in mm (inches)



Connection head, form B, degree of protection IP65, made of cast light alloy, with standard hinged cover, dimensions in mm (inches)



Connection head, form B, degree of protection IP65, made of cast light alloy, with high hinged cover, dimensions in mm (inches)



Connection head, form B-VA, degree of protection IP65, made of stainless steel, with screw cover, dimensions in mm (inches)

Resistance thermometers

# Accessories - Welding-type protective tubes, neck tubes and connection heads

Selection and Ordering of	lata			Article No.
without neck tube, without o	welding stub, for measuring inse	· ·	•	
Up to 540 °C (1004 °F) Protective tube to DIN 43772	2, form 4 made of 13 CrMo 44, m	nat. No. 1.7335		
Cone length C mm (inch)  • 65 (2.56) 140 (5.51)  • 65 (2.56) 200 (7.87)  • 125 (4.92) 260 (10.24)	be Weight mm (inch)  0.3 (0.66)  0.5 (1.1)  0.5 (1.1)  0.6 (1.32)			7MC1905-1GA 7MC1905-2GA 7MC1905-3GA 7MC1905-4GA
Up to 550 °C (1022 °F) Protective tube to DIN 43772	, form 4 made of 6 CrNiMoTi 17	122, mat. No. 1.4571		
Cone Protective tulength C length L mm (inch) mm (inch)  • 65 (2.56) 140 (5.51)	be Weight kg (lb) 0.3 (0.66)			7MC1905-1DA
• 65 (2.56) 200 (7.87) • 125 (4.92) 200 (7.87) • 125 (4.92) 260 (10.24)	0.5 (1.1) 0.5 (1.1) 0.6 (1.32)			7MC1905-2DA 7MC1905-3DA 7MC1905-4DA
Selection and Ordering of	lata			Article No.
<b>J</b> .	screw-in resistance thermome No. 1.4571, with thread at both en		pe with 6 mm (0.24 incl	n) OD
Neck tube Iength without conrum (inch)	of the resistance thermometer, ection head	Protective tube length mm (inch)	Weight kg (lb)	
<ul> <li>135 (5.31)</li> <li>395 (15.55)</li> <li>165 (6.50)</li> <li>305/365 (12</li> <li>195 (7.68)</li> <li>395 (15.55)</li> <li>225 (8.86)</li> <li>365 (14.37)</li> <li>255 (10.04)</li> <li>395 (15.55)</li> </ul>	01/14.37)	260 (10.24) 140/200 (5.51/7.87) 200 (7.87) 140 (5.51) 140 (5.51)	0.14 (0.31) 0.15 (0.33) 0.18 (0.40) 0.20 (0.44) 0.22 (0.49)	7MC1906-1AA 7MC1906-2AA 7MC1906-3AA 7MC1906-4AA 7MC1906-5AA

Selection and Ordering data	Article No.
Connection heads for low-pressure, high-pressure, flue gas and flange-type resistance thermometers	
Connection head, form B, degree of protection IP54 Made of cast light alloy, with screw cover and with 1 cable bushing, weight: 0.14 kg (0.31 lb) Made of plastic, with screw cover and with 1 cable bushing, weight: 0.08 kg (0.18 lb)	7MC1907-1BA 7MC1907-1BK
Connection head, form B, degree of protection IP65 Weight: 0.3 kg (0.66 lb) Made of cast light alloy, with standard hinged cover and with 1 cable bushing Made of cast light alloy, with high hinged cover and with 1 cable bushing	7MC1907-1BF 7MC1907-1BL
Connection head, form B-VA, degree of protection IP65  Made of stainless steel, with screw cover and with 1 cable bushing, weight: 0.65 kg (1.43 lb)	7MC1907-1BV
Accessories for connection head, form B, degree of protection IP65 Quick-release clamp (degree of protection of connection head reduced to IP54) Weight: 0.02 kg (0.04 lb)	7MC1907-1BS

Connection heads with a drilled hole of 15.5 mm diameter (0.61 inch) instead of the female thread M24 x 1.5 on request.

### Thermocouples

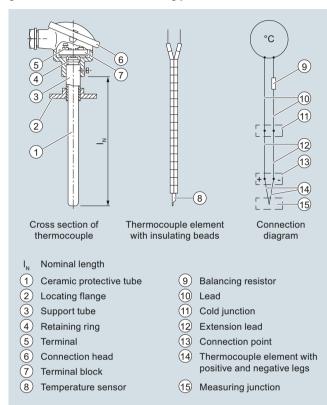
#### **Technical description**

### Design

A thermocouple comprises

- •The thermocouple element (sensor) and
- •The mounting and connection parts required in each case.

The thermocouple element is formed by two conductors of dissimilar metals or metal alloys which are soldered or welded together at one end, the measuring junction:



Thermocouple element

### Function

# Measuring principle of the thermocouple element

If the measuring junction is exposed to a temperature different from that at the free ends of the thermocouple, a voltage (the thermoelectric voltage, Seebeck effect) is produced at these free ends. The magnitude of the thermoelectric voltage depends on the difference in temperature between the measuring junction and the free ends, and on the combination of materials in the thermocouple. Since a thermocouple always measures a temperature difference, the free ends of the thermocouple must be connected to a reference junction (cold junction) and held constant at a known temperature.

# Calibration data for thermoelectric voltages and permissible deviations

The calibration data and the permissible deviations for commonly used thermocouples are defined isee Technical Data, Table "Calibration data for thermoelectric voltages and error limits").

The thermocouples Cu-CuNi and Fe-CuNi to DIN 43710 are used for replacement purposes. Thermocouples of class 2 are supplied as standard. For more accurate measurements, thermocouples are available with half the DIN tolerance or with a test certificate. The tolerances only apply to the condition upon delivery.

During operation at high temperatures, the tolerances of the thermocouples may change due to absorption of foreign matter, oxidation or evaporation of alloy components.

#### Mode of operation

The thermocouples are extended from the connection point to a point whose temperature is as constant as possible (the cold junction) by means of extension leads.

The extension leads have the same color code as the associated thermocouple elements; the positive pole is marked in red. Correct polarity must be ensured since otherwise large errors will occur. Up to 200 °C, the same calibration data and tolerances apply to the extension leads as to the corresponding thermo-couples.

The influence of temperature changes at the cold junction can be balanced by means of a compensating circuit, e.g. a compensating box. The reference temperature is 0 (32 °F) or 20 °C (68 °F).

It is also possible to keep the cold junctions at a constant temperature of 50, 60 or 70 °C (122, 140 or 158 °F) using a thermostat (for several measuring junctions).

The connections from the cold junction to the measuring or process instrument are made using copper leads. With energy-consuming instruments such as indicators or multipoint recorders, the complete measuring circuit (thermocouple, extension lead and copper lead) must be balanced in the operating condition using a resistor. SITRANS T transmitters and process recorders for connection to thermocouple elements have a built-in compensating circuit for balancing the effect of the ambient temperature on the cold junction. Lead balancing is not necessary in this case because of the high input impedance.

### Protection fitting/protective tubes

The thermocouple can be protected against mechanical stress and chemical attack by a ceramic or metal protective tube which may be mounted using flanges, screwed glands or by welding into the pipeline or tank. The thermocouple element terminates in the connection head.

Installation examples with specification of the recommended thermocouples and protective tube materials are listed on pages "Technical Data"and "Installation Examples".

Owing to the different operating conditions, no guarantee can be given for protective fittings. The manufacturer is responsible for damages and measuring errors caused by wrong installation in compliance with the General Terms of Delivery if the instruments have been installed by the manufacturer and if the specifications for the operating conditions furnished by the customer were correct and sufficiently detailed.

Thermocouple elements are very compatible since it is almost always possible to adapt them in shape and size to the particular problem. The temperature-responsive part is almost point-shaped. Thermocouple elements are therefore particularly suitable for measuring rapidly changing temperatures.

Thermocouples

### Straight thermocouples to DIN 43733, with connection head

# Overview

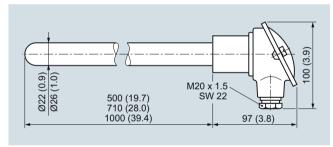


The straight thermocouple together with a metal protective tube is suitable for temperatures from 0 to 1250 °C (32 to 2282 °F) and can be supplied with a built-in temperature transmitter.

### Technical specifications

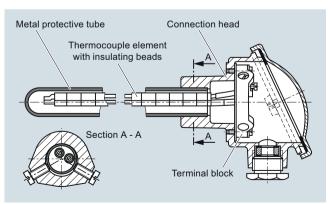
Thermocouples	Ni Cr/Ni type K
• Number	1 or 2
• Leg diameter	2 3 mm (0.08 0.12 inch)
<ul> <li>Insulation of legs</li> </ul>	Insulating beads
Protective tube	Metal
Connection head	Form A, DIN 43729; made of cast light alloy, with one cable bushing

### Dimensional drawings



Straight thermocouple, dimensions in mm (inches)

### Design



Straight thermocouple with base-metal element Ni Cr/Ni with metal protective tube  $\,$ 

Selection and Ordering data	Article No.
Straight thermocouple with Ni Cr/Ni thermocouple (type K) with metallic protective tube	7MC2000 0
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal length Enter customer specific length with Y44, see Order codes below	
300 500 mm (11.81 19.68 inch) Initial: 500 mm (19.68 inch)	1
501 710 mm (19.72 27.95 inch) Initial: 710 mm (27.95 inch)	2
711 1 000 mm (27.11 39.37 inch) Initial: 1 000 mm (39.37 inch)	3
Protective tube	
to 1 000 °C (1 832 °F) X 10 CrAl 24, material No. 1.4762 Ø 22 mm x 2 mm (0.87 inch x 0.079 inch) Leg diameter 2 mm (0.08 inch)	D
to 1 100 °C (2 012 °F) X 18 CrN28, material No. 1.4749 Ø 26 mm x 4 mm (1.02 inch x 0.16 inch) Leg diameter 3 mm (0.12 inch)	E
to 1 200 °C (2 192 °F) X 15 CrNi Si 24 19, material No. 1.4841 Ø 22 mm x 2 mm (0.87 inch x 0.079 inch) Leg diameter 2 mm (0.08 inch)	F
to 1 250 °C (2 282 °F) CrAl 205 (Kantal AF), material No. 1.4767 Ø 22 mm x 2 mm (0.87 inch x 0.079 inch) Leg diameter 3 mm (0.12 inch)	н
Number of thermocouples	
1 thermocouple	С
2 thermocouples	D
Connection head, form A,	
made of cast light alloy, with 1 cable inlet and - screw cover - high hinged cover	1 6

Selection and Ordering data	Order code
Straight thermocouple with Ni Cr/Ni thermocouple (type K) for temperatures to 1250 °C (2282 °F); with metallic protective tube	
Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special version, specify in plain text	Y98
Process number for special version	Y99
TAG plate made of stainless steel specify TAG No. in plain text	Y15
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points).	Y33
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44

To order a temperature transmitter installed in the connection head, see "Temperature transmitters for installation in the connection head" (page 2/94).

Installation of a transmitter is only possible here in the versions with a high hinged cover (7MC2000-....6).

Thermocouples

# Straight thermocouples Individual parts and accessories

Selection and C	Ordering data	Article No.
Metallic protective thermocouple electo DIN 43733		
	erial No. 1.4762  Ø 0.87 inch x 0.08 inch), 21 2.42 lb), dished  Protective tube length in mm (inch): 520 (20.5) 730 (28.7) 1020 (40.2)	7MC2900-1DA 7MC2900-2DA 7MC2900-3DA
	erial No. 1.4749  (Ø 1.02 inch x 0.16 inch),  76 4.85 lb), dished  Protective tube length in mm (inch):  520 (20.5)  730 (28.7)  1020 (40.2)	7MC2900-1EC 7MC2900-2EC 7MC2900-3EC
	, material No. 1.4841 Ø 0.87 inch x 0.08 inch), dished Protective tube length in mm (inch): 1020 (40.2)	7MC2900-3FA
	rry, material No. 1.4767  Ø 0.87 inch x 0.05 inch), 21 2.42 lb)  Protective tube length in mm (inch): 520 (20.5) 730 (28.7) 1020 (40.2)	7MC2900-1HA 7MC2900-2HA 7MC2900-3HA

Selection and Ordering data		Article No.
Thermocouples eler thermocouple accord		
Base-metal thermodebeads		
Wire diameter 3 mm (0.12 inch) Ni Cr/Ni, to 1000 °C (maximal 1300 °C), (to 1832 °F (max. 2372 °F)) 0.55 2.10 kg (1.21 4.63 lb) Nominal Thermocouple length L1 in length L2 in mm (inch): mm (inch):  • 500 (19.7) 540 (21.3)  • 710 (28.0) 750 (29.5)		7MC2903-1CA 7MC2903-2CA
• 1000 (39.4) 1040 (40.9)		7MC2903-3CA

### Straight thermocouples Individual parts and accessories

# Connection heads

Connection head, form A (without terminal block and terminals) for protective tube diameter (bore = protective tube diameter +0.5 mm (0.02 inch))

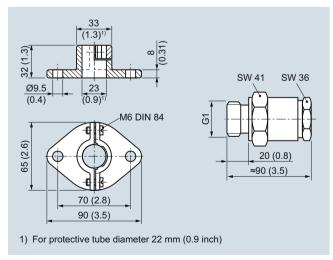
Selection and Ordering data	Article No.
Connection head, form A, (without terminal block and terminals) 1 Cable inlet, degree of protection IP53, 0.35 kg (0.77 lb)	
Cast light alloy	
fastener, unscrewable	
for protective tube diameter in mm (inch)	
(bore = protective tube diam. +0.5 mm) (0.02 inch):	
• 22 (0.87)	7MC2905-1AA
,	
• 26 (1.02)	7MC2905-1BA
Cast light alloy	
high hinged cover	
for protective tube diameter in mm (inch)	
(bore = protective tube diam. +0.5 mm)	
(0.02 inch):	
• 22 (0.87)	7MC2905-4AA
• 26 (1.02)	7MC2905-4BA

### Mounting accessories for connection heads

- Terminal block
- Terminal
- · Set of gaskets
- · Set of washers
- Mounting flange
- Threaded sleeve

Selection and Ordering data	Article No.
Mounting accessories	
Terminal block without terminals for base-metal thermocouples; 0.06 kg (0.13 lb)	7MC2998-1AA
Terminal for base-metal thermocouples; 0.01 kg (0.02 lb)	7MC2998-1BA
Set of gaskets (100 off) for the connection head cover; 0.01 kg (0.02 lb)	7MC2998-1CA
Set of washers (100 off) for the terminal block; 0.01 kg (0.02 lb)	7MC2998-1CB
Mounting flange, adjustable; made of GTW  • for protective tube outer diameters 22 mm (0.87 inch); 0.35 kg (0.77 lb)  • for protective tube outer diameters 26 mm (1.02 inch); 0.32 kg (0.71 lb)	7MC2998-2CB 7MC2998-2CC
Threaded sleeve Gas-tight up to 1 bar (14.5 psi), adjustable, materiall No. 1.0718, with gasket; 0.40 kg (0.88 lb) • for protective tube outer diameters 22 mm (0.87 inch), G1 • for protective tube outer diameters 26 mm (1.02 inch), G1	7MC2998-2DB 7MC2998-2DC

# Dimensional drawings



Mounting flange to DIN 43734 (left) and threaded sleeve (right) for installing straight thermocouples, dimensions in mm (inches)

Transmitters for mounting in sensor head

SITRANS TH100 two-wire system (Pt100)

### Overview



The SITRANS TH100 dispenses with electrical isolation and universal sensor connection to provide a low-cost alternative for Pt100 measurements.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Its extremely compact design makes the SITRANS TH100 ideal for the retrofitting of measuring points or for the use of analog transmitters.

The transmitter is available as a non-Ex version as well as for use in potentially explosive atmospheres.

#### Benefits

- Two-wire transmitter
- Assembly in connection head type B (DIN 43729) or larger, or on a standard DIN rail
- Can be programmed, which means that the sensor connection, measuring range, etc. can also be programmed
- Intrinsically-safe version for use in potentially explosive areas

### Application

Used in conjunction with Pt100 resistance thermometers, the SITRANS TH100 transmitters are ideal for measuring temperatures in all industries. Due to its compact size it can be installed in the connection head type B (DIN 43729) or larger.

The output signal is a direct current from 4 to 20 mA that is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "modem for SITRANS TK" (Article No. 7NG3190-6KB), you can continue using this to parameterize the SITRANS TH100.

Transmitters of the "intrinsically-safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

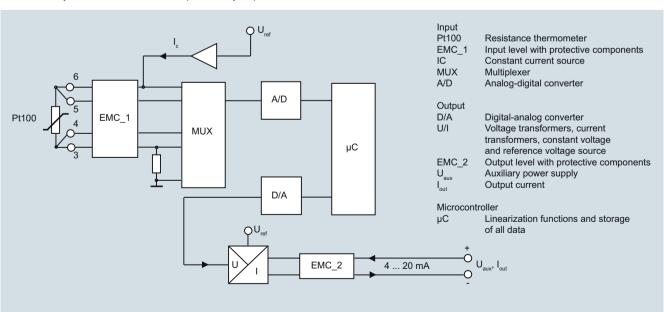
#### Function

#### Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire system) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog/digital converter. They are converted in the microcontroller in accordance with the sensor characteristics and further parameters (measuring range, damping, ambient temperature etc.).

The signal prepared in this way is converted in a digital/analog converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100, function diagram

Transmitters for mounting in sensor head

# SITRANS TH100 two-wire system (Pt100)

# Technical specifications

lechnical specifications			
Input		Construction	
Resistance thermometer		Weight	50 g
Measured variable	Temperature	Dimensions	See dimensional drawing
Sensor type	PT100 to IEC 60751	Material	Molded plastic
Characteristic curve	Temperature-linear	Cross-section of cables	Max. 2.5 mm <sup>2</sup> (AWG 13)
Type of connection	2-, 3- or 4-wire circuit	Degree of protection to IEC 60529	
Resolution	14 bit	• Enclosure	IP40
Measuring accuracy		<ul><li>Terminals</li></ul>	IP00
<ul> <li>Span &lt;250 °C (450 °F)</li> <li>Span &gt;250 °C (450 °F)</li> </ul>	< 0.25 °C (0.45 °F) < 0.1 % of span	Certificates and approvals	
Repeatability	< 0.1 °C (0.18 °F)	Explosion protection ATEX EC type test certificate	PTB 05 ATEX 2049X
Measuring current	,	<ul><li>"Intrinsic gas safety" type of pro-</li></ul>	II 1 G Ex ia IIC T6/T4
•	approx. 0.4 mA	tection	II (1) 2 G Ex ib [ia Ga] IIC T6/T4 Gb
Measuring cycle	< 0.7 s		II (1) 3 G Ex ic [ia Ga] IIC T6/T4 Gc II 3 G Ex ic IIC T6/T4 Gc
Measuring range	-200 +850 °C -328 +1562 °F)	• "Non-sparking" type of protection	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA[ic] IIC T6/T4 Gc
Measuring span	25 1050 °C (77 1922 °F)	<ul><li>"Intrinsic dust safety" type of pro-</li></ul>	II 1 D Ex ia IIIC T115 °C Da
Unit	°C or °F	tection	
Offset	programmable: -100 +100 °C (-180 +180 °F)	<ul><li>Explosion protection FM for USA</li><li>FM approval</li></ul>	FM 3024169
Line resistance	Max. 20 $\Omega$ (total from feeder and return conductor)	Degree of protection	IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4
Noise rejection	50 and 60 Hz		CI I / ZN 0 / AEx ia IIC T6, T5, T4 NI / CI I / Div 2 / GP ABCDFG T6,
Output			T5, T4 NI / CI I / ZN 2 / IIC T6, T5, T4
Output signal	4 20 mA, two-wire	Explosion protection FM for Canada	
Auxiliary power	8.5 36 V DC (30 V for Ex ia and ib; 32 V for Ex nL/ic; 35 V for Ex nA)	( <sub>c</sub> FM <sub>US</sub> ) • FM approval	FM 3024169C
Max. load	(U <sub>aux</sub> - 8.5 V)/0.023 A	<ul> <li>Degree of protection</li> </ul>	IS / CI I, II, III / Div 1/ GP ABCDEFG T6, T5, T4
Overrange	3.6 23 mA, infinitely adjustable (default range: 3.84 20.5 mA)		NI / CI I / DIV 2 / GP ABCD T6, T5, T4
Error signal (following sensor fault)	3.6 23 mA, infinitely adjustable		NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4
(conforming to NE43)	(default range: 3.6 mA or 22.8 mA)		DIP / CI II, III / Div 2 / GP FG T6, T5, T4
Damping time	0 30 s (default value: 0 s)		CI I / ZN 0 / Ex ia IIC T6, T5, T4 CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
Protection	Against reversed polarity	Other certificates	EAC Ex(GOST), NEPSI
Resolution	12 bit	Software requirements for	EAG EX(GOST), INEL OF
Accuracy at 23 °C (73.4 °F)	< 0.1 % of span	SIPROM T	
Temperature effect	< 0.1 %/10 °C (0.1 %/18 °F)	PC operating system	Windows ME, 2000, XP, Win 7 and
Effect of auxiliary power	< 0.01 % of span/V		Win 8; can also be used in con- nection with RS 232 modem
Effect of load impedance	$<$ 0.025 % of max. span/100 $\Omega$		under Windows 95, 98 and 98SE
Long-term drift	< 0.025 % of the max. span in the first month     < 0.035 % of the max. span after one year     < 0.05 % of the max. span after 5 years		
Ambient conditions			
Ambient temperature range	-40 +85 °C (-40 +185 °F)		

Ambient temperature range Storage temperature range Relative humidity

Electromagnetic compatibility

-40 ... +85 °C (-40 ... +185 °F) -40 ... +85 °C (-40 ... +185 °F) 98 %, with condensation According to EN 61326 and NAMUR NE21

Transmitters for mounting in sensor head

### SITRANS TH100 two-wire system (Pt100)

Selection and Ordering data	Article No.
SITRANS TH100 temperature transmitters for Pt100 for installation in connection head, type B (DIN 43729), two-wire system, 4 20 mA, programmable, without electrical isolation	
Without explosion protection	7NG3211-0NN00
With explosion protection "Intrinsic safety" type of protection and for zone 2     to ATEX     to FM ( <sub>c</sub> FM <sub>US</sub> )      ■ ■	7NG3211-0AN00 7NG3211-0BN00
Further designs	Order code
Add "-Z" to Article No. and specify Order code(s)	
Test report (5 measuring points)	C11
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>1)</sup>
Measuring point no. (TAG), max. 8 characters	Y17 <sup>2)</sup>
Measuring point descriptor, max. 16 characters	Y23 <sup>2)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>3)</sup>
Pt100 (IEC) 3-wire	U03 <sup>3)</sup>
Pt100 (IEC) 4-wire	U04 <sup>3)</sup>
Special differing customer-specific programming, specify in plain text	Y09 <sup>4)</sup>
Fail-safe value 3.6 mA (instead of 22,8 mA)	U36 <sup>2)</sup>
Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software With USB connection	7NG3092-8KU
MiniDVD for temperature measuring instruments With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	A5E00364512
DIN rail adapters for head transmitters (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	7NG3092-8KC

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- <sup>2)</sup> For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

### Ordering example

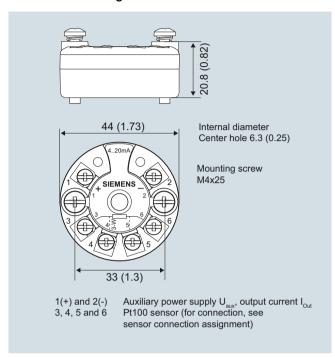
7NG3211-0NN00-Z Y01+Y23+U03

Y01: -10 ... +100 °C

# Y23: TICA1234HEAT Factory setting:

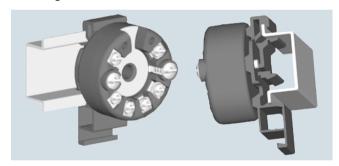
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °C)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 C (0 °F)
- Damping 0.0 s

### Dimensional drawings

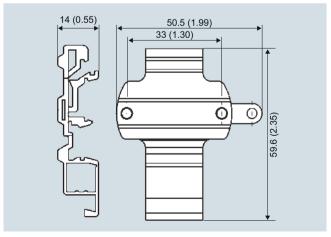


SITRANS TH100, dimensions in mm (inch)

### Mounting on DIN rail



SITRANS TH100, mounting of transmitter on DIN rail

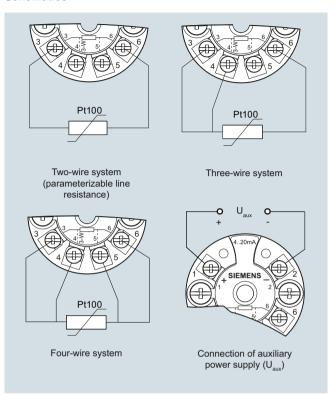


DIN rail adaptor, dimensions in mm (inch)

Transmitters for mounting in sensor head

SITRANS TH100 two-wire system (Pt100)

# Schematics



SITRANS TH100, sensor connection assignment

Transmitters for mounting in sensor head

SITRANS TH200 two-wire system, universal

#### Overview



#### Ultra flexible - with the universal SITRANS TH200 transmitter

- Two-wire devices for 4 to 20 mA
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over PC

#### Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrically isolated
- · Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- · Configuration status stored in EEPROM
- SIL2 (with Order code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

### Application

SITRANS TH200 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

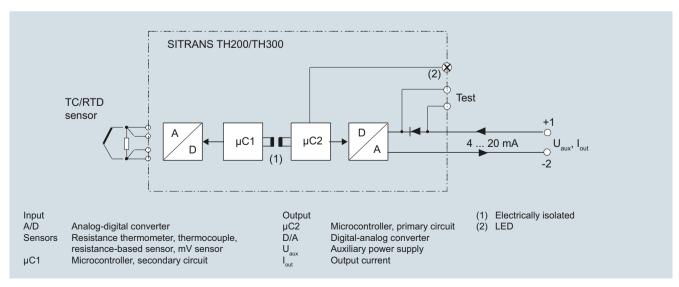
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

### Function

The SITRANS TH200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH200 function diagram

# Transmitters for mounting in sensor head

# SITRANS TH200 two-wire system, universal

Technical specifications			
Input		Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
Resistance thermometer		Open-circuit monitoring	Always active (cannot be dis-
Measured variable	Temperature	Open-circuit monitoring	abled)
Sensor type		Short-circuit monitoring	can be switched on/off (default
• to IEC 60751	Pt25 Pt1000		value: OFF)
• To JIS C 1604; a = 0.00392 K <sup>-1</sup>	Pt25 Pt1000	Measuring range	parameterizable max. 0 2200 $\Omega$ (see table "Digital measuring
• to IEC 60751	Ni25 Ni1000		errors")
Special type	over special characteristic (max. 30 points)	Min. measured span	$5~\Omega \dots 25~\Omega$ (see Table "Digital measuring errors")
Sensor factor	0.25 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 1000)	Characteristic curve	Resistance-linear or special characteristic
Units	°C or °F	Thermocouples	_
Connection		Measured variable	Temperature
Standard connection	1 resistance thermometer (RTD)	Sensor type (thermocouples)	
	in 2-wire, 3-wire or 4-wire system	• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
<ul> <li>Generation of average value</li> </ul>	2 identical resistance thermome-	<ul><li>Type C</li><li>Type D</li></ul>	W5 %-Re acc. to ASTM 988 W3 %-Re acc. to ASTM 988
	ters in 2-wire system for genera- tion of average temperature	• Type E	NiCr-CuNi to DIN IEC 584
Generation of difference	2 identical resistance thermome-	• Type J	Fe-CuNi to DIN IEC 584
	ters (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)	• Type K	NiCr-Ni to DIN IEC 584
lote of a c	(RID I - RID 2 OF RID 2 - RID I)	• Type L	Fe-CuNi to DIN 43710
Interface		• Type N	NiCrSi-NiSi to DIN IEC 584
Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	• Type R	Pt13Rh-Pt to DIN IEC 584
Three-wire system	No balancing required	<ul><li>Type S</li><li>Type T</li></ul>	Pt10Rh-Pt to DIN IEC 584 Cu-CuNi to DIN IEC 584
• Four-wire system	No balancing required	• Type U	Cu-CuNi to DIN 43710
Sensor current	≤ 0.45 mA	Units	°C or °F
Response time	≤ 250 ms for 1 sensor with open-	Connection	
. isopones time	circuit monitoring	Standard connection	1 thermocouple (TC)
Open-circuit monitoring	Always active (cannot be dis-	Generation of average value	2 thermocouples (TC)
Short-circuit monitoring	abled) can be switched on/off (default	Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Measuring range	value: ON)  parameterizable (see table "Digi-	Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
Min	tal measuring errors")	Open-circuit monitoring	Can be switched off
Min. measured span	10 °C (18 °F)	Cold junction compensation	
Characteristic curve	Temperature-linear or special characteristic	• Internal	With integrated Pt100 resistance thermometer
Resistance-based sensors	A study registers of	• External	With external Pt100 IEC 60571
Measured variable	Actual resistance		(2-wire or 3-wire connection)
Sensor type	Resistance-based, potentiometers	External fixed	Cold junction temperature can be set as fixed value
Units	Ω	Measuring range	Parameterizable (see table "Digital measuring errors")
Connection	4 (D):	Min. measured span	Min. 40 100 °C (72 180 °F)
Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system	Mill. Measured Spari	(see table "Digital measuring errors")
Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value	Characteristic curve	Temperature-linear or special characteristic
Generation of difference	2 resistance thermometers in	mV sensor	
	2-wire system (R1 – R2 or R2 – R1)	Measured variable	DC voltage
Interface	(111 - 112 01 112 - 111)	Sensor type	DC voltage source (DC voltage
	Parameterizable line resistance		source possible over an exter- nally connected resistor)
Two-wire system	$\leq$ 100 $\Omega$ (loop resistance)	Units	mV
Three-wire system	No balancing required	Response time	≤ 250 ms for 1 sensor with open-
Four-wire system	No balancing required	. Isopones and	circuit monitoring
Sensor current	≤ 0.45 mA	Open-circuit monitoring	Can be switched off
		Measuring range	-10 +70 mV-100 +1100 mV

Measuring range

-10 ... +70 mV-100 ... +1100 mV

Transmitters for mounting in sensor head

SITRANS TH200 two-wire sy	stem, universal
Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 +3.5 V DC
Input resistance	$\geq$ 1 M $\Omega$
Characteristic curve	Voltage-linear or special charac-
	teristic
Output	4 20 m A 2 wire
Output signal	4 20 mA, 2-wire
Auxiliary power	11 35 V DC ((to 30 V for Ex ia and ib; to 32 V for Ex nA / nL / ic)
Max. load	(U <sub>aux</sub> - 11 V)/0.023 A
Overrange	3.6 23 mA, infinitely adjustable (default range: 3.80 mA 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output (1 kV <sub>eff</sub> )
Measuring accuracy	
Digital measuring errors	See table "Digital measuring errors"
Reference conditions	
<ul> <li>Auxiliary power</li> </ul>	24 V ± 1 %
• Load	500 Ω
<ul> <li>Ambient temperature</li> </ul>	23 °C
Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
<ul> <li>Analog measuring error</li> </ul>	0.02 % of span/10°C (18 °F)
<ul> <li>Digital measuring errors</li> </ul>	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 $\Omega$
Long-term drift	
<ul> <li>In the first month</li> </ul>	< 0.02 % of span
After one year	< 0.2 % of span
After 5 years	< 0.3 % of span
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 +85 °C (-40 +185 °F)
Storage temperature range	-40 +85 °C (-40 +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Construction	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm <sup>2</sup> (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP40
• Terminals	IP00

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 05 ATEX 2040X
"Intrinsic safety" type of protection	II 1 G Ex ia IIC T6/T4 II 2 (1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 1D Ex iaD 20 T115 °C
"Operating equipment that is non- ignitable and has limited energy" type of protection	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4
Explosion protection: FM for USA	
• FM approval	FM 3024169
Degree of protection	IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 CI I / ZN 0 / AEx ia IIC T6, T5, T4 NI / CI I / Div 2 / GP ABCDFG T6 T5, T4 NI / CI I / ZN 2 / IIC T6, T5, T4
Explosion protection to FM for Canada ( $_{\rm c}{\rm FM_{US}}$ )	
• FM approval	FM 3024169C
Degree of protection	IS / CI I, II, III / Div 1/ GP ABCDEFG T6, T5, T4 NI / CI I / DIV 2 / GP ABCD T6, T5 T4 NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4 DIP / CI II, III / Div 2 / GP FG T6, T5, T4 CI I / ZN 0 / Ex ia IIC T6, T5, T4 CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
Other certificates	EAC Ex(GOST), NEPSI, IEC, EXPOLABS

# Software requirements for SIPROM T

Windows ME, 2000, XP, Win 7 and Win 8; can also be used in con-nection with RS 232 modem PC operating system under Windows 95, 98 and 98SE

### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
  Measuring range: 0 ... 100 °C (32 ... 212 °F)
  Fault current: 22.8 mA
  Sensor offset: 0 °C (0 °F)
  Damping 0.0 s

Transmitters for mounting in sensor head

### SITRANS TH200 two-wire system, universal

### Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

#### Resistance-based sensors

-			
Input	ut Measuring range		Digital accuracy
	Ω	Ω	Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

### Thermocouples

Input	Measuring range		Min. n sured	Digital accu- racy	
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	100 1820 (212 3308)	100	(180)	2 <sup>1)</sup>	(3.6) <sup>1)</sup>
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.6)
Type D (W3)	0 2300 (32 4172)	100	(180)	1 <sup>2)</sup>	$(1.8)^{2)}$
Type E	-200 +1000 (-328 +1832)	50	(90)	1	(1.8)
Type J	-210 +1200 (-346 +2192)	50	(90)	1	(1.8)
Туре К	-230 +1370 (-382 +2498)	50	(90)	1	(1.8)
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.8)
Type N	-200 +1300 (-328 +2372)	50	(90)	1	(1.8)
Type R	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Туре Т	-200 +400 (-328 +752)	40	(72)	1	(1.8)
Type U	-200 +600 (-328 +1112)	50	(90)	2	(3.6)

 $<sup>^{1)}</sup>$  The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

### mV sensor

Input Measuring range		Min. measured span	Digital accuracy	
	mV	mV	μV	
mV sensor	-10 +70	2	40	
mV sensor	-100 +1100	20	400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

 $<sup>^2)</sup>$  The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

Transmitters for mounting in sensor head

### SITRANS TH200 two-wire system, universal

Selection and Ordering data		Article No.
Temperature transmitter SITRANS TH200		
for installation in connection head, type B (DIN 43729), two-wire system, 4 20 mA, programmable, with electrical isolation		
<ul> <li>Without explosion protection</li> </ul>	▶ •	7NG3211-1NN00
With explosion protection		
- to ATEX	▶ •	7NG3211-1AN00
- to FM ( <sub>c</sub> FM <sub>US</sub> )	▶ •	7NG3211-1BN00
Further designs		Order code
Add "-Z" to Article No. and specify Order code(s	;)	
With test protocol (5 measuring points)		C11
Functional safety SIL2		C20
Functional safety SIL2/3		C23
Customer-specific programming Add "-Z" to Article No. and specify Order code(s	;)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F		Y01 <sup>1)</sup>
Measuring point no. (TAG), max. 8 characters		Y17 <sup>2)</sup>
Measuring point descriptor, max. 16 characters		Y23 <sup>2)</sup>
Measuring point message, max. 32 characters	3	Y24 <sup>2)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$		U02 <sup>3)</sup>
Pt100 (IEC) 3-wire		U03 <sup>3)</sup>
Pt100 (IEC) 4-wire		U04 <sup>3)</sup>
Thermocouple type B		U20 <sup>3)4)</sup>
Thermocouple type C (W5)		U21 <sup>3)4)</sup>
Thermocouple type D (W3)		U22 <sup>3)4)</sup>
Thermocouple type E		U23 <sup>3)4)</sup>
Thermocouple type J		U24 <sup>3)4)</sup>
Thermocouple type K		U25 <sup>3)4)</sup>
Thermocouple type L		U26 <sup>3)4)</sup>
Thermocouple type N		U27 <sup>3)4)</sup>
Thermocouple type R		U28 <sup>3)4)</sup>
Thermocouple type S		U29 <sup>3)4)</sup>
Thermocouple type T		U30 <sup>3)4)</sup>
Thermocouple type U		U31 <sup>3)4)</sup>
With TC: CJC external (Pt100, 3-wire)		U41
With TC: CJC external with fixed value, specify in plain text $$	,	Y50
Special differing customer-specific programming, specify in plain text		Y09 <sup>5)</sup>
Fail-safe value 3.6 mA (instead of 22,8 mA)		U36 <sup>2)</sup>
Cable extension Transmitter with installed cable extension 200 mm (7.81 inch), for Pt100 in four-wire system		W01

Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software With USB connection	7NG3092-8KU
MiniDVD for temperature measuring instruments With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	A5E00364512
<b>DIN rail adapters for head transmitters</b> (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	7NG3092-8KC

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- <sup>2)</sup> For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- <sup>5)</sup> For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

### Ordering example 1:

7NG3211-1NN00-Z Y01+Y17+U03

Y01: -10 ... +100 °C Y17: TICA123

# Ordering example 2:

7NG3211-1NN00-Z Y01+Y23+U25

Y01: -10 ... +100 °C Y23: TICA1234HEAT

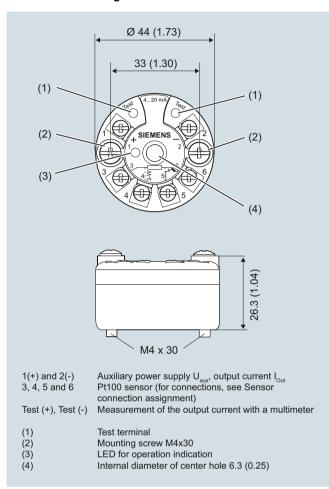
### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
  Damping 0.0 s

Transmitters for mounting in sensor head

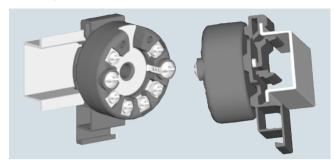
### SITRANS TH200 two-wire system, universal

# Dimensional drawings

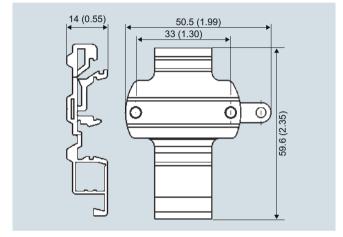


SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch)

### Mounting on DIN rail



SITRANS TH200, mounting of transmitter on DIN rail

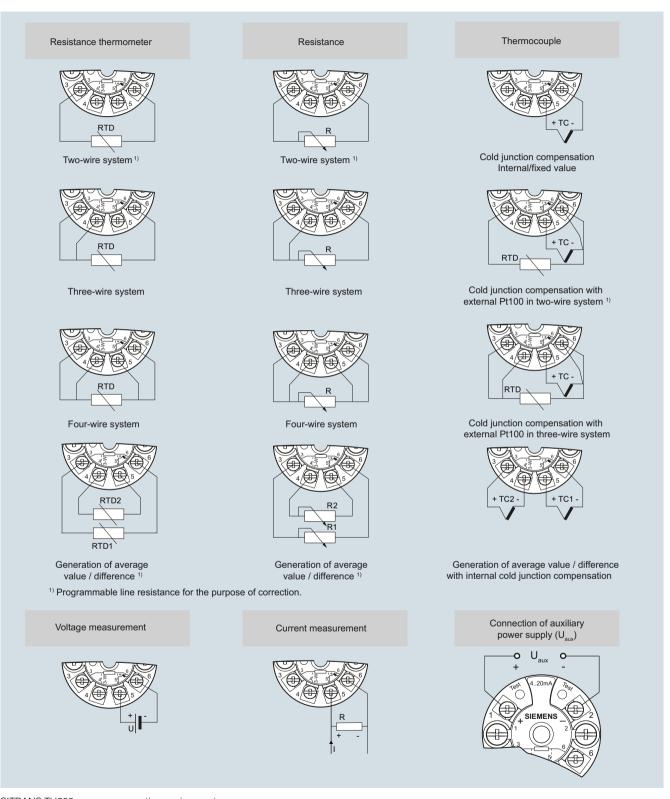


DIN rail adapter, dimensions in mm (inch)

Transmitters for mounting in sensor head

SITRANS TH200 two-wire system, universal

### Schematics



SITRANS TH200, sensor connection assignment

Transmitters for mounting in sensor head

SITRANS TH300 two-wire system, universal, HART

### Overview



#### "HART" to beat - the universal SITRANS TH300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over HART

#### Benefits

- · Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- · Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- · Configuration status stored in EEPROM
- SIL2 (with Order code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

# Application

SITRANS TH300 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- · Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

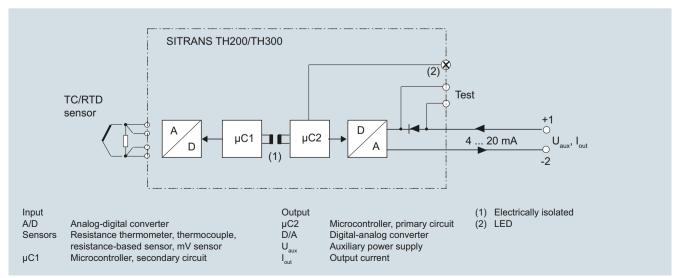
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

#### Function

The SITRANS TH300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



Transmitters for mounting in sensor head

# SITRANS TH300 two-wire system, universal, HART

# Technical specifications

Technical specifications			
Input		Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
Resistance thermometer		Open-circuit monitoring	Always active (cannot be disabled)
Measured variable	Temperature	Short-circuit monitoring	can be switched on/off (default
Sensor type		oner enear mermering	value: OFF)
• to IEC 60751	Pt25 Pt1000	Measuring range	parameterizable max. 0 2200 Ω
• To JIS C 1604; $a = 0.00392 \text{ K}^{-1}$	Pt25 Pt1000		(see table "Digital measuring errors")
• to IEC 60751	Ni25 Ni1000	Min. measured span	5 25 $\Omega$ (see table "Digital mea-
Special type	over special characteristic (max. 30 points)	Characteristic curve	suring errors") Resistance-linear or special char-
Sensor factor	0.25 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 1000)	Thermocouples	acteristic
Units	°C or °F	Measured variable	Temperature
Connection	0 01 1	Sensor type (thermocouples)	
Standard connection	1 resistance thermometer (RTD)	• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
s dandard dominoction	in 2-wire, 3-wire or 4-wire system	• Type C	W5 %-Re acc. to ASTM 988
<ul> <li>Generation of average value</li> </ul>	2 identical resistance thermome-	• Type D	W3 %-Re acc. to ASTM 988
	ters in 2-wire system for genera- tion of average temperature	• Type E	NiCr-CuNi to DIN IEC 584
Generation of difference	2 identical resistance thermome-	• Type J	Fe-CuNi to DIN IEC 584
	ters (RTD) in 2-wire system	• Type K	NiCr-Ni to DIN IEC 584
l-4	(RTD 1 – RTD 2 or RTD 2 – RTD 1)	• Type L	Fe-CuNi to DIN 43710
Interface	Danis de la line de la	• Type N	NiCrSi-NiSi to DIN IEC 584
Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	• Type R	Pt13Rh-Pt to DIN IEC 584
Three-wire system	No balancing required	• Type S	Pt10Rh-Pt to DIN IEC 584
Four-wire system	No balancing required	• Type T	Cu-CuNi to DIN IEC 584
Sensor current	≤ 0.45 mA	• Type U	Cu-CuNi to DIN 43710
Response time	≤ 250 ms for 1 sensor with open-	Units	°C or °F
	circuit monitoring	Connection	
Open-circuit monitoring	Always active (cannot be dis-	Standard connection	1 thermocouple (TC)
Chart aire it manitaria	abled)	Generation of average value	2 thermocouples (TC)
Short-circuit monitoring	can be switched on/off (default value: ON)	Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Measuring range	parameterizable (see table "Digital measuring errors")	Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
Min. measured span	10 °C (18 °F)	Open-circuit monitoring	can be switched off
Characteristic curve	Temperature-linear or special characteristic	Cold junction compensation	
Resistance-based sensors		• Internal	With integrated Pt100 resistance
Measured variable	Actual resistance		thermometer
Sensor type	Resistance-based, potentiometers	• External	With external Pt100 IEC 60571 (2-wire or 3-wire connection)
Units	Ω	<ul> <li>External fixed</li> </ul>	Cold junction temperature can be set as fixed value
Connection		Measuring range	parameterizable (see table "Digi-
Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system	Min. measured span	tal measuring errors")  Min. 40 100 °C (72 180 °F)
Generation of average value	2 resistance-based sensors in 2-wire system for generation of	With Medadied spair	(see table "Digital measuring errors")
Generation of difference	average value  2 resistance thermometers in  2-wire system	Characteristic curve mV sensor	Temperature-linear or special characteristic
Interface	(R1 – R2 or R2 – R1)	Measured variable	DC voltage
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	Sensor type	DC voltage source (DC voltage source possible over an exter-
Three-wire system	No balancing required	11-2-	nally connected resistor)
Four-wire system	No balancing required	Units	mV
Sensor current	≤ 0.45 mA	Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
		Open-circuit monitoring	Can be switched off

# Transmitters for mounting in sensor head

		SITRANS TH300 two-w	vire system, universal, HART	
Measuring range	-10 +70 mV	Construction		
	-100 +1100 mV	Material	Molded plastic	
Min. measured span	2 mV or 20 mV	Weight	50 g (0.11 lb)	
Overload capability of the input	-1.5 +3.5 V DC	Dimensions	See "Dimensional drawings"	
Input resistance	≥ 1 MΩ	Cross-section of cables	Max. 2.5 mm <sup>2</sup> (AWG 13)	
Characteristic curve	Voltage-linear or special characteristic	Degree of protection to IEC 60529		
Output		• Enclosure	IP40	
Output signal	4 20 mA, 2-wire with communi-	Terminals	IP00	
	cation acc. to HART Rev. 5.9	Certificates and approvals		
Auxiliary power	11 35 V DC (to 30 V for Ex ia and ib; to 32 V for Ex nA/nL/ic)	Explosion protection ATEX	DTD of ATEV on the	
Max. load	(U <sub>aux</sub> -11 V)/0.023 A	EC type test certificate	PTB 05 ATEX 2040X	
Overrange	3.6 23 mA, infinitely adjustable (default range: 3.80 mA 20.5 mA)	"Intrinsic safety" type of protection	II 1 G Ex ia IIC T6/T4 II 2 (1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 1D Ex iaD 20 T115 °C	
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 23 mA, infinitely adjustable (default value: 22.8 mA)	<ul> <li>"Operating equipment that is non- ignitable and has limited energy" type of protection</li> </ul>	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4	
Sample cycle	0.25 s nominal	Explosion protection: FM for USA		
Damping	Software filter 1st order 0 30 s (parameterizable)	<ul> <li>FM approval</li> </ul>	FM 3024169	
Protection	Against reversed polarity	<ul> <li>Degree of protection</li> </ul>	IS / CI I, II, III / Div 1 / GP	
Electrically isolated	Input against output (1 kV <sub>eff</sub> )		ABCDEFG T6, T5, T4 CI I / ZN 0 / AEx ia IIC T6, T5, T4	
Measuring accuracy	e. e		NI / CI I / Div 2 / GP ABCDFG T6, T5, T4	
Digital measuring errors	See Table "Digital measuring		NI / CI I / ZN 2 / IIC T6, T5, T4	
Defenses and liking	errors"	Explosion protection to FM for Canada (cFMUS)		
Reference conditions	041/114.0/	• FM approval	FM 3024169C	
Auxiliary power	24 V ± 1 %	Degree of protection	IS / CI I, II, III / Div 1/ GP	
• Load	500 Ω	-	ABCDEFG T6, T5, T4 NI/CII/DIV 2/GP ABCD T6, T5,	
Ambient temperature	23 °C		T4	
Warming-up time	> 5 min		NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4	
Error in the analog output (digital/analog converter)	< 0.025 % of span		DIP / CI II, III / Div 2 / GP FG T6, T5, T4	
Error due to internal cold junction	< 0.5 °C (0.9 °F)		Cl I / ZN 0 / Ex ia IIC T6, T5, T4	
Influence of ambient temperature			CI I / ZN 2 / Ex nA nL IIC T6, T5, T4	
<ul> <li>Analog measuring error</li> </ul>	0.02 % of span/10°C (18 °F)	Other certificates	EAC Ex(GOST), NEPSI, IEC,	
<ul> <li>Digital measuring errors</li> </ul>			EXPOLABS	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)	Factory setting:		
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)	Pt100 (IEC 751) with 3-wire circuit		
Auxiliary power effect	< 0.001 % of span/V	<ul> <li>Measuring range: 0 100 °C (32 212 °F)</li> </ul>		
Effect of load impedance	< 0.002 % of span/100 $\Omega$	Fault current: 22.8 mA		
Long-term drift		• Sensor offset: 0 °C (0 °F)		
<ul> <li>In the first month</li> </ul>	< 0.02 % of span	Damping 0.0 s		
<ul> <li>After one year</li> </ul>	< 0.2 % of span			

• After 5 years

Ambient conditions

Ambient temperature range Storage temperature range

Relative humidity

Electromagnetic compatibility

-40 ... +85 °C (-40 ... +185 °F)

-40 ... +85 °C (-40 ... +185 °F)

< 0.3 % of span

< 98 %, with condensation

acc. to EN 61326 and NE21

Transmitters for mounting in sensor head

### SITRANS TH300 two-wire system, universal, HART

### Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni 1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

#### Resistance-based sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

# Thermocouples

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	100 1820 (212 3308)	100	(180)	2 <sup>1)</sup>	(3.6) <sup>1)</sup>
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.6)
Type D (W3)	0 2300 (32 4172)	100	(180)	1 <sup>2)</sup>	$(1.8)^{2)}$
Type E	-200 +1000 (-328 +1832)	50	(90)	1	(1.8)
Type J	-210 +1200 (-346 +2192)	50	(90)	1	(1.8)
Type K	-230 +1370 (-382 +2498)	50	(90)	1	(1.8)
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.8)
Type N	-200 +1300 (-328 +2372)	50	(90)	1	(1.8)
Type R	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Туре Т	-200 +400 (-328 +752)	40	(72)	1	(1.8)
Type U	-200 +600 (-328 +1112)	50	(90)	2	(3.6)

 $<sup>^{1)}</sup>$  The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

### mV sensor

Input	Measuring range	Min. mea- sured span	Digital accuracy
	mV	mV	μV
mV sensor	-10 +70	2	40
mV sensor	-100 +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

 $<sup>^{2)}</sup>$  The digital accuracy in the range 1750 to 2300 (3182 to 4172 °F) is 2 °C (3.6 °F).

### Transmitters for mounting in sensor head

### SITRANS TH300 two-wire system, universal, HART

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TH300	
for installation in connection head, type B (DIN 43729), two-wire system 4 20 mA, communication capable to HART, with galvanic isolation	
Without explosion protection	7NG3212-0NN00
With explosion protection	
- to ATEX ▶ •	7NG3212-0AN00
- to FM ( <sub>C</sub> FM <sub>US</sub> ) ▶ •	7NG3212-0BN00
Further designs	Order code
Add "-Z" to Article No. and specify Order code(s)	
with test protocol (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits):	Y01 <sup>1)</sup>
Y01: to °C, °F	
Measuring point no. (TAG), max. 8 characters	Y17 <sup>2)</sup>
Measuring point descriptor, max. 16 characters	Y23 <sup>2)</sup>
Measuring point message, max. 32 characters	Y24 <sup>2)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>3)</sup>
Pt100 (IEC) 3-wire	U03 <sup>3)</sup>
Pt100 (IEC) 4-wire	U04 <sup>3)</sup>
Thermocouple type B	U20 <sup>3)4)</sup>
Thermocouple type C (W5)	U21 <sup>3)4)</sup>
Thermocouple type D (W3)	U22 <sup>3)4)</sup>
Thermocouple type E	U23 <sup>3)4)</sup>
Thermocouple type J	U24 <sup>3)4)</sup>
Thermocouple type K	U25 <sup>3)4)</sup>
Thermocouple type L	U26 <sup>3)4)</sup>
Thermocouple type N	U27 <sup>3)4)</sup>
Thermocouple type R	U28 <sup>3)4)</sup>
Thermocouple type S	U29 <sup>3)4)</sup>
Thermocouple type T	U30 <sup>3)4)</sup>
Thermocouple type U	U31 <sup>3)4)</sup>
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>5)</sup>
Fail-safe value 3.6 mA (instead of 22,8 mA)	U36 <sup>2)</sup>
Cable extension Transmitter with installed cable extension 200 mm (7.87 inch), for Pt100 in four-wire system	W01

on the mass of the	
Accessories	Article No.
MiniDVD for temperature measuring instruments   MiniDVD for temperature measuring instruments	A5E00364512
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	
HART modem	
With USB connection	7MF4997-1DB
SIMATIC PDM operating software	See Section 8
DIN rail adapters for head transmitters	7NG3092-8KA
(Quantity delivered: 5 units)	
Connecting cable	7NG3092-8KC
4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- <sup>1)</sup> For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- 5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must

Supply units see Chapter "Supplementary Components".

### Ordering example 1:

7NG3212-0NN00-Z Y01+Y17+U03

Y01: -10 ... +100 °C Y17: TICA123

### Ordering example 2:

7NG3212-0NN00-Z Y01+Y23+U25

Y01: -10 ... +100 °C Y23: TICA1234HEAT

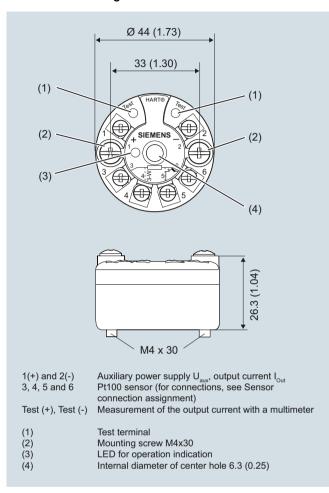
### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
  Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Transmitters for mounting in sensor head

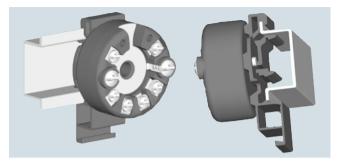
SITRANS TH300 two-wire system, universal, HART

# Dimensional drawings

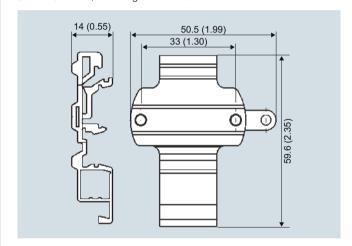


SITRANS TH300, dimensions and pin assignment, dimensions in mm (inch)  $\,$ 

### Mounting on DIN rail



SITRANS TH300, mounting of transmitter on DIN rail

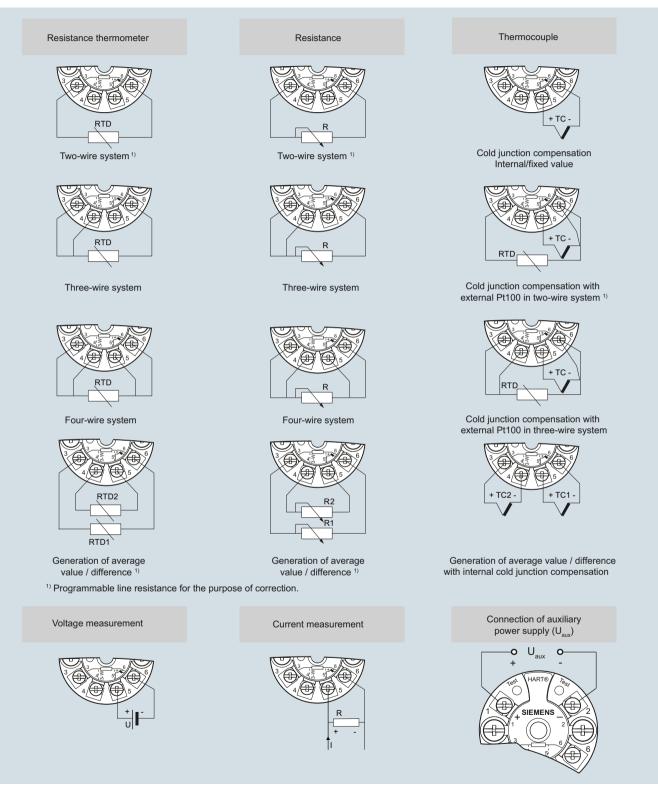


DIN rail adapter, dimensions in mm (inch)

Transmitters for mounting in sensor head

SITRANS TH300 two-wire system, universal, HART

# Schematics



SITRANS TH300, sensor connection assignment

Transmitters for mounting in sensor head

#### SITRANS TH400 fieldbus transmitter

#### Overview



#### SITRANS TH400 fieldbus transmitters

#### Versions:

- For FOUNDATION fieldbus
- For PROFIBUS PA

The SITRANS TH400 temperature transmitter is a small field bus transmitter for mounting in the connection head of form B. Extensive functionality enables the temperature transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options. Thanks to its universal concept it can be used in all industries and is easy to integrate in the context of Totally Integrated Automation applications.

Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

Installing SITRANS TH400 in temperature sensors turns them into complete, bus-capable measuring points; compact - and in a single device.

## Application

- Linearized temperature measurement with resistance thermometers or thermal elements
- Differential, mean-value or redundant temperature measurement with resistance thermometers or thermal elements
- Linear resistance and bipolar millivolt measurements
- Differential, mean-value or redundant resistance and bipolar millivolt measurements

#### Function

#### Features

- Mounting in connection head, type B, to DIN 43729, or larger
- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- · Electrically isolated
- Intrinsically-safe version for use in potentially explosive areas
- Special characteristic
- Sensor redundance

#### With PROFIBUS PA communication

• Function blocks: 2 x analog

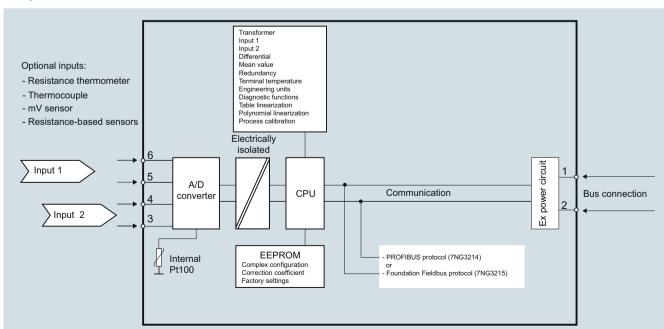
#### With FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

#### Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TH400 (7NG3214-... and 7NG3215-...) is the type of fieldbus protocol used (PROFIBUS PA or FOUNDATION fieldbus).

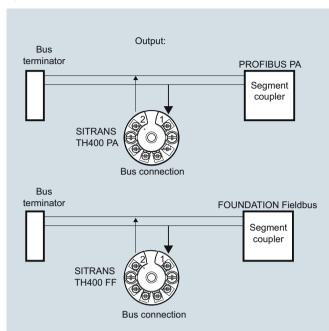


SITRANS TH400, function diagram

Transmitters for mounting in sensor head

# SITRANS TH400 fieldbus transmitter

## System communication



SITRANS TH400, communication interface

# Technical specifications

Input	
Analog-to-digital conversion	
<ul> <li>Measurement rate</li> </ul>	< 50 ms
Resolution	24-bit
Resistance thermometer	
Pt25 Pt1000 to IEC 60751/JIS C 1604	
Measuring range	-200 +850 °C (-328 +1562 °F)
Ni25 Ni1000 to DIN 43760	
Measuring range	-60 +250 °C (-76 +482 °F)
Cu10 Cu1000, $\alpha = 0.00427$	
Measuring range	-50 +200 °C (-58 +392 °F)
Line resistance per sensor cable	Max. 50 $\Omega$
Sensor current	Nominal 0.2 mA
Sensor fault detection	
<ul> <li>Sensor break detection</li> </ul>	Yes
<ul> <li>Sensor short-circuit detection</li> </ul>	Yes, $< 15 \Omega$
Resistance-based sensors	
Measuring range	$0~\Omega \dots 10~k\Omega$
Line resistance per sensor cable	Max. 50 $\Omega$
Sensor current	Nominal 0.2 mA
Sensor fault detection	
<ul> <li>Sensor break detection</li> </ul>	Yes
Sensor short-circuit detection	Yes, $< 15 \Omega$

Thermocouple				
to IEC 584	Measuring range			
• Type B	400 +1820 °C (7	752 3308 °F)		
• Type E	-100 +1000 °C (-148 +1832 °F)			
• Type J	-100 +1000 °C (-148 +1832 °F)			
• Type K	-100 +1200 °C (-148 +2192 °F)			
• Type N	-180 +1300 °C	(-292 +2372 °F)		
• Type R	-50 +1760 °C (-	-58 +3200 °F)		
• Type S	-50 +1760 °C (-	-58 +3200 °F)		
• Type T	-200 +400 °C (-	-328 +752 °F)		
to DIN 43710				
• Type L	-200 +900 °C (-	-328 +1652 °F)		
• Type U	-200 +600 °C (-	-328 +1112 °F)		
to ASTM E988-90				
• Type W3	0 2300 °C (32	+4172 °F)		
• Type W5	0 2300 °C (32	+4172 °F)		
External cold junction compensation	-40 +135 °C (-4	10 +275 °F)		
Sensor fault detection				
Sensor break detection	Yes			
Sensor short-circuit detection	Yes, < 3 mV			
<ul> <li>Sensor current in the event of open-circuit monitoring</li> </ul>	4 μΑ			
mV sensor - voltage input				
Measuring range	-800 +800 mV			
Input resistance	10 ΜΩ			
Output				
Filter time (programmable)	0 60 s			
•	0 60 s < 400 ms			
Filter time (programmable)				
Filter time (programmable) Update time				
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic				
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.		Temperature coefficient		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values	< 400 ms  Absolute accu-	coefficient ≤±0.002 % of		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input	< 400 ms  Absolute accuracy ≤ ± 0.05 % of the	coefficient ≤±0.002 % of the measured		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All	< 400 ms  Absolute accuracy ≤ ± 0.05 % of the	coefficient ≤±0.002 % of the measured		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values	Absolute accuracy ≤±0.05 % of the measured value	coefficient  ≤±0.002 % of the measured value/°C  Temperature		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  Basic values Type of input	Absolute accuracy ≤±0.05 % of the measured value	coefficient  ≤±0.002 % of the measured value/°C  Temperature coefficient		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000	Absolute accuracy ≤±0.05 % of the measured value  Basic accuracy ≤±0.1 °C	coefficient  ≤±0.002 % of the measured value/°C  Temperature coefficient  ≤±0.002 °C/°C		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100	Absolute accuracy ≤±0.05 % of the measured value  Basic accuracy ≤±0.1 °C ≤±0.15 °C	coefficient  ≤±0.002 % of the measured value/°C  Temperature coefficient  ≤±0.002 °C/°C ≤±0.002 °C/°C		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10	Absolute accuracy ≤±0.05 % of the measured value  Basic accuracy ≤±0.1 °C ≤±0.15 °C ≤±1.3 °C	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.02 \text{ °C/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors	Absolute accuracy $\leq \pm 0.05 \%$ of the measured value Basic accuracy $\leq \pm 0.1 \%$ C $\leq \pm 0.15 \%$ C $\leq \pm 1.3 \%$ C $\leq \pm 0.05 \%$	coefficient $ \leq \pm \ 0.002 \ \% \ \text{of} $ the measured value/°C		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type:	Absolute accuracy $\leq \pm 0.05 \%$ of the measured value Basic accuracy $\leq \pm 0.1  ^{\circ}\text{C}$ $\leq \pm 0.15  ^{\circ}\text{C}$ $\leq \pm 1.3  ^{\circ}\text{C}$ $\leq \pm 1.05  \Omega$ $\leq \pm 10  \mu\text{V}$	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \Omega/\text{°C} $ $ \leq \pm 0.02 \Omega/\text{°C} $ $ \leq \pm 0.2 \% \mu\text{V/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type: E, J, K, L, N, T, U Thermocouple, type:	Absolute accuracy	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \Omega/\text{°C} $ $ \leq \pm 0.2 \% \mu\text{V/°C} $ $ \leq \pm 0.01 \text{ °C/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type: E, J, K, L, N, T, U Thermocouple, type: B, R, S, W3, W5	Absolute accuracy $\leq \pm 0.05$ % of the measured value Basic accuracy $\leq \pm 0.1$ °C $\leq \pm 0.15$ °C $\leq \pm 1.3$ °C $\leq \pm 1.05$ $\Omega$ $\leq \pm 10$ $\mu$ V $\leq \pm 0.5$ °C $\leq \pm 1$ °C	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \Omega/\text{°C} $ $ \leq \pm 0.2 \% \mu\text{V/°C} $ $ \leq \pm 0.01 \text{ °C/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type: E, J, K, L, N, T, U Thermocouple, type: B, R, S, W3, W5 Cold junction compensation	Absolute accuracy $\leq \pm 0.05$ % of the measured value Basic accuracy $\leq \pm 0.1$ °C $\leq \pm 0.15$ °C $\leq \pm 1.3$ °C $\leq \pm 1.05$ $\Omega$ $\leq \pm 10$ $\mu$ V $\leq \pm 0.5$ °C $\leq \pm 1$ °C	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \Omega/\text{°C} $ $ \leq \pm 0.2 \% \mu\text{V/°C} $ $ \leq \pm 0.01 \text{ °C/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type: E, J, K, L, N, T, U Thermocouple, type: B, R, S, W3, W5 Cold junction compensation Reference conditions	Absolute accuracy $\leq \pm 0.05$ % of the measured value Basic accuracy $\leq \pm 0.1$ °C $\leq \pm 0.15$ °C $\leq \pm 0.15$ °C $\leq \pm 1.3$ °C $\leq \pm 10$ $\mu$ V $\leq \pm 0.5$ °C $\leq \pm 1.5$ °C $\leq \pm 1.5$ °C	coefficient $ \leq \pm 0.002 \% \text{ of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.002 \Omega/\text{°C} $ $ \leq \pm 0.2 \% \mu\text{V/°C} $ $ \leq \pm 0.01 \text{ °C/°C} $		
Filter time (programmable) Update time  Measuring accuracy Accuracy is defined as the higher value of general values and basic values.  General values Type of input  All  Basic values Type of input  Pt100 and Pt1000 Ni100 Cu10 Resistance-based sensors Voltage source Thermocouple, type: E, J, K, L, N, T, U Thermocouple, type: B, R, S, W3, W5 Cold junction compensation Reference conditions Warming-up time	Absolute accuracy	coefficient $ \leq \pm 0.002 \text{ % of the measured value/°C} $ Temperature coefficient $ \leq \pm 0.002 \text{ °C/°C} $ $ \leq \pm 0.001 \text{ °C/°C} $ $ \leq \pm 0.01 \text{ °C/°C} $ $ \leq \pm 0.025 \text{ °C/°C} $		

Transmitters for mounting in sensor head

# SITRANS TH400 fieldbus transmitter

SITRANS TH400 fieldbus tra	nsiiittei		
Conditions of use		Certificates and approvals	
Ambient conditions		Explosion protection ATEX	
Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	EC type test certificate	KEMA 06 ATEX 0264
Permissible storage temperature Relative humidity	-40 +85 °C (-40 +185 °F) ≤ 98 %, with condensation	• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T4T6 II 2(1) G Ex ib[ia] IIC T4T6 II 1 D Ex iaD
Insulation resistance		EC type test certificate	KEMA 06 ATEX 0263 X
Test voltage	500 V AC for 60 s	Type of protection for "equipment	II 3 GD Ex nA[nL] IIC T4T6
Mechanical testing		is non-arcing"	II 3 GD Ex nL IIC T4T6
• Vibrations (DIN class B) to	IEC 60068-2-6 and IEC 60068-2-64 4 g/2 100 Hz	Explosion protection: FM for USA	II 3 GD Ex nA[ic] IIC T4T6 II 3 GD Ex ic IIC T4T6
Electromagnetic compatibility	<u> </u>	<ul> <li>FM approval</li> </ul>	FM 3027985
EMC noise voltage influence	< ± 0.1 % of span	<ul> <li>Degree of protection</li> </ul>	• IS Class I, Div 1, Groups A, B, C,
Extended EMC noise immunity: NAMUR NE 21, criterion A, Burst	< ± 1 % of span		D T4/T5/T6, FISCO  • IS Class I, Zone 0, AEx ia, IIC
EMC 2004/108/EC Emission and Noise Immunity to	EN 61326		T4/T5/T6, FISCO  • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6, FNICO
Construction		Explosion protection CSA for	,
Material	Molded plastic	Canada	
Weight	55 g (0.12 lb)	<ul> <li>CSA approval</li> </ul>	CSA 1861385
Dimensions	See Dimensional drawings	<ul> <li>Degree of protection</li> </ul>	<ul> <li>IS Class I, Div 1, Groups A, B, C, D T4/T5/T6</li> </ul>
Cross-section of cables	Max. 2.5 mm <sup>2</sup> (AWG 13)		• Ex ia IIC T4/T5/T6 and
Degree of protection			Ex ib [ia] IIC T4/T5/T6
Transmitter enclosure	IP40		<ul> <li>NI Class I, Div 2, Groups A, B, C, D T4/T5/T6</li> </ul>
Terminal	IP00		• Ex nA II T4/T5/T6
Auxiliary power		Other certificates	EAC Ex(GOST), NEPSI, IECEX
Power supply		Communication	
• Standard, Ex "nA", Ex "nL", NI	9.0 32 V DC	Parameterization interface	
ATEX, FM, UL and CSA      In FIGO (FNICO) is a talket in a second s	9.0 30 V DC	<ul> <li>PROFIBUS PA connection</li> </ul>	
In FISCO/FNICO installations  Pauser consumption	9.0 17.5 V DC	- Protocol	Profile 3.0
Power consumption  May increase in power consump	< 11 mA < 7 mA	- Address (for delivery)	126
Max. increase in power consumption in the event of a fault	< / IIIA	<ul> <li>FOUNDATION fieldbus connection</li> </ul>	
		- Protocol	FF protocol
		- Functionality	Basic or LAS
		- Version	ITK 4.6
		- Function blocks	2 x analog and 1 x PID
		Factory setting	
		only for SITRANS TH400 PA	
		Sensor	Pt100 (IEC)
		Type of connection	3-wire circuit
		Unit	°C
		Failure mode	Last valid value
		Filter time	0 \$
		PA address PROFIBUS Ident No.	126 Manufacturer-specific
		only for SITRANS TH400 FF	manuracturer-specific
		Sensor	Pt100 (IEC)
		Type of connection	3-wire circuit
		Unit	°C
		Failure mode	Last valid value
		Filter time	0 s
		i iitor tiirio	

Node address

22

# Transmitters for mounting in sensor head

## SITRANS TH400 fieldbus transmitter

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TH400	
for installation in connection head, with electrical isolation, order operating instructions separately.	
<ul> <li>Bus-compatible to PROFIBUS PA</li> </ul>	
<ul> <li>No explosion protection or Zone 2/Div 2 ►          to ATEX/FM/CSA/IECEX/NEPSI</li> </ul>	7NG3214-0NN00
- With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" ▶ •	7NG3214-0AN00
<ul> <li>Bus-compatible to FOUNDATION Fieldbus</li> </ul>	
- No explosion protection or Zone 2/Div 2 ▶  to ATEX/FM/CSA/IECEX/NEPSI	7NG3215-0NN00
- With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" ▶ •	7NG3215-0AN00
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
With test protocol (5 measuring points)	C11
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>1)</sup>
Measuring point no. (TAG), max. 32 characters	Y17 <sup>2)</sup>
Measuring point descriptor, max. 32 characters	Y23 <sup>2)</sup>
Measuring point message, max. 32 characters	Y24 <sup>2)</sup>
Bus address, specify in plain text	Y25 <sup>2)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>3)</sup>
Pt100 (IEC) 3-wire	U03 <sup>3)</sup>
Pt100 (IEC) 4-wire	U04 <sup>3)</sup>
Thermocouple type B	U20 <sup>3)4)</sup>
Thermocouple type C (W5)	U21 <sup>3)4)</sup>
Thermocouple type D (W3)	U22 <sup>3)4)</sup>
Thermocouple type E	U23 <sup>3)4)</sup>
Thermocouple type J	U24 <sup>3)4)</sup>
Thermocouple type K	U25 <sup>3)4)</sup>
Thermocouple type L	U26 <sup>3)4)</sup>
Thermocouple type N	U27 <sup>3)4)</sup>
Thermocouple type R	U28 <sup>3)4)</sup>
Thermocouple type S	U29 <sup>3)4)</sup>
Thermocouple type T	U30 <sup>3)4)</sup>
Thermocouple type U	U31 <sup>3)4)</sup>
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>5)</sup>

Accessories		Article No.
MiniDVD for temperature measuring instruments	<b>&gt;</b>	A5E00364512
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software		
SIMATIC PDM operating software	See Chapter 8	
DIN rail adapters for head transmitters	7NG3092-8KA	
(Quantity delivered: 5 units)		
Connecting cable		7NG3092-8KC
4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)		
for additional PA components		See Catalog IK P

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- $^{5)}\,$  For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

#### Ordering example 1:

7NG3214-0NN00-Z Y01+Y17+U03

Y01: 0...100 °C Y17: TICA1234HEAT

#### Ordering example 2:

7NG3214-0NN00-Z Y01+Y17+Y25+U25

Y01: 0...500 °C Y17: TICA5678HEAT

Y25: 33

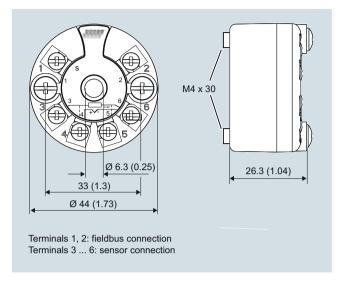
## Factory setting:

- For SITRANS TH400 PA:
  - Pt100 (IEC 751) with 3-wire circuit
  - Unit: °C
  - Failure mode: Last valid value
  - Filter time: 0 s
  - PA address: 126
  - PROFIBUS Ident No.: Manufacturer-specific
- For SITRANS TH400 FF:
- Pt100 (IEC 751) with 3-wire circuit
- Unit: °C
- Failure mode: Last valid value
- Filter time: 0 s - Node address: 22

Transmitters for mounting in sensor head

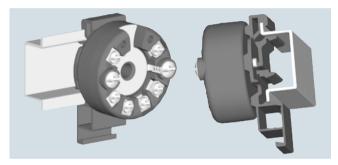
# **SITRANS TH400 fieldbus transmitter**

# Dimensional drawings

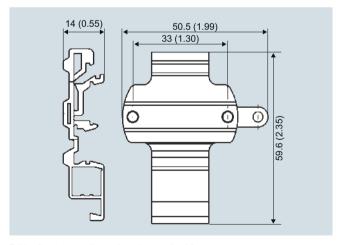


SITRANS TH400 dimensions in mm (inches) and connections

# Mounting on DIN rail



SITRANS TH400, mounting of transmitter on DIN rail



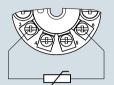
DIN rail adaptor, dimensions in mm (inch)

Transmitters for mounting in sensor head

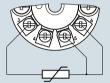
# **SITRANS TH400 fieldbus transmitter**

# Schematics

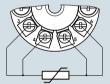
#### Resistance thermometer



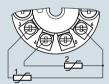
Two-wire system 1)



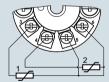
Three-wire system



Four-wire system



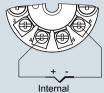
Mean-value/differential or redundancy generation 2 x two-wire system 1)



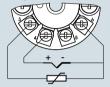
Mean-value/differential or redundancy generation

- 1 sensor in two-wire system 1)
- 1 sensor in three-wire system

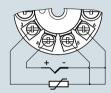
#### Thermocouple



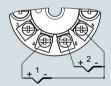
cold junction compensation



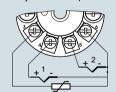
Cold junction compensation with external Pt100 in two-wire system 1)



Cold junction compensation with external Pt100 in three-wire system

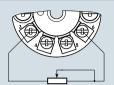


Mean value, differential or redundancy generation with internal cold junction compensation

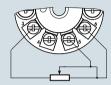


Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system <sup>1)</sup>

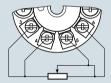
#### Resistance



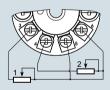
Two-wire system 1)



Three-wire system



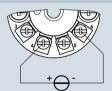
Four-wire system



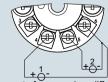
Mean value, differential or redundancy generation

- 1 resistor in two-wire system 1)
- 1 resistor in three-wire system

#### Voltage measurement



One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

SITRANS TH400, sensor connection assignment

<sup>&</sup>lt;sup>1)</sup> Programmable line resistance for the purpose of correction.

Transmitters for rail mounting

#### SITRANS TR200 two-wire system, universal

#### Overview



#### Ultra flexible - with the universal SITRANS TR200 transmitter

- Two-wire devices for 4 to 20 mA
- · Enclosure for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over PC

#### Benefits

- · Compact design
- · Electrically isolated
- · Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- · Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order code C20), SIL2/3 (with C23)

## Application

SITRANS TR200 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

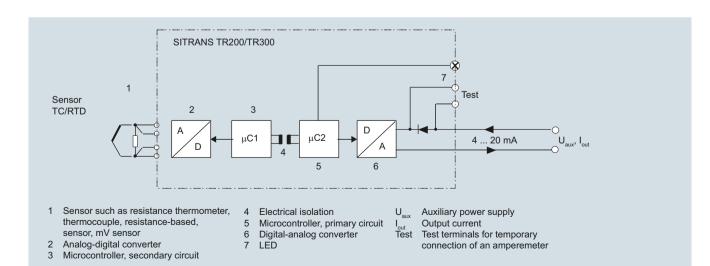
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX).

#### Function

The SITRANS TR200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR200 function diagram

Transmitters for rail mounting

# SITRANS TR200 two-wire system, universal

# Technical specifications

#### Input

#### Resistance thermometer

Measured variable

Sensor type

- to IEC 60751
- to JIS C 1604: a=0.00392 K<sup>-1</sup>
- to IEC 60751
- Special type

Sensor factor

Units

Connection

- Standard connection
- Generation of average value
- Generation of difference

#### Interface

- Two-wire system
- Three-wire system
- Four-wire system

Sensor current

Response time T<sub>63</sub>

Open-circuit monitoring Short-circuit monitoring

Measuring range

Min. measured span Characteristic curve

#### Resistance-based sensors

Measured variable

Sensor type

Units Connection

Normal connection

- Generation of average value
- Generation of difference

#### Interface

- Two-wire system
- Three-wire system
- Four-wire system

Sensor current Response time  $T_{63}$ 

Open-circuit monitoring

Temperature

Pt25 ... 1000 Pt25 ... 1000

Ni25 ... 1000

over special characteristic (max. 30 points)

0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)

°C or °F

1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system

2 resistance thermometers in 2-wire system for generation of average temperature

2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)

Parameterizable line resistance  $\leq 100 \Omega$  (loop resistance)

No balancing required

No balancing required

≤ 0.45 mA

≤ 250 ms for 1 sensor with open-circuit monitoring

Always active (cannot be disabled) can be switched on/off (default value: ON)

parameterizable (see table "Digital measuring errors")

10 °C (18 °F)

Temperature-linear or special characteristic

Actual resistance

Resistance-based, potentiometers

Ω

1 resistance-based sensor (R) in 2wire, 3-wire or 4-wire system

2 resistance-based sensors in 2-wire system for generation of average value

2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)

Parameterizable line resistance  $\leq 100 \Omega$  (loop resistance)

No balancing required

No balancing required

≤ 0.45 mA

≤ 250 ms for 1 sensor with open-circuit monitoring

Always active (cannot be disabled)

Short-circuit monitoring

Measuring range

Min. measured span

Characteristic curve

#### Thermocouples

Measured variable

Sensor type (thermocouples)

- Type B
- Type C
- Type D
- Type E
- Type J
- Type K
- Type L
- Type N
- Type R
- Type S
- Type T
- Type U

Units

Connection

- Standard connection
- Generation of average value
- Generation of difference

Response time T<sub>63</sub>

Open-circuit monitoring
Cold junction compensation

- Internal
- External
- External fixed

Measuring range

Min. measured span

Characteristic curve

mV sensor

Measured variable

Sensor type

Units

Response time T<sub>63</sub>

Open-circuit monitoring
Measuring range

Min. measured span

Overload capability of the input

Input resistance
Characteristic curve

can be switched on/off (default value: OFF)

parameterizable max. 0 ... 2200  $\Omega$  (see table "Digital measuring

 $5 \dots 25 \Omega$  (see table "Digital measuring errors")

Resistance-linear or special characteristic

Temperature

Pt30Rh-Pt6Rh to DIN IEC 584 W5 %-Re acc. to ASTM 988 W3 %-Re acc. to ASTM 988

NiCr-CuNi to DIN IEC 584 Fe-CuNi to DIN IEC 584 NiCr-Ni to DIN IEC 584

Fe-CuNi to DIN 43710 NiCrSi-NiSi to DIN IEC 584 Pt13Rh-Pt to DIN IEC 584

Pt10Rh-Pt to DIN IEC 584 Cu-CuNi to DIN IEC 584 Cu-CuNi to DIN 43710

°C or °F

1 thermocouple (TC)

2 thermocouples (TC)

2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)

≤ 250 ms for 1 sensor with open-circuit monitoring

Can be switched off

With integrated Pt100 resistance thermometer

With external Pt100 IEC 60571 (2-wire or 3-wire connection)

Cold junction temperature can be set as fixed value

parameterizable (see table "Digital measuring errors")

Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")

Temperature-linear or special characteristic

DC voltage

DC voltage source (DC voltage source possible over an externally connected resistor)

mV

≤ 250 ms for 1 sensor with open-circuit monitoring

Can be switched off

parameterizable max. -100 ... 1100 mV

2 mV or 20 mV -1.5 ... +3.5 V DC

≥ 1 MΩ

Voltage-linear or special characteristic

Transmitters for rail mounting

# SITRANS TR200 two-wire system, universal

	yorom, amroroa
Output	
Output signal	4 20 mA, 2-wire
Auxiliary power	11 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA)
Max. load	(U <sub>aux</sub> - 11 V)/0.023 A
Overrange	3.6 23 mA, infinitely adjustable (default range: 3.84 mA 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output 2.12 kV DC (1.5 kV <sub>eff</sub> AC)
Measuring accuracy	
Digital measuring errors Reference conditions	See Table "Digital measuring errors"
<ul> <li>Auxiliary power</li> </ul>	24 V ± 1 %
• Load	500 Ω
Ambient temperature	23 °C
Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
<ul> <li>Analog measuring error</li> </ul>	0.02 % of span/10 °C (18 °F)
<ul> <li>Digital measuring errors</li> </ul>	
- With resistance thermometer	0.06 °C (0.11 °F)/10 °C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 $\Omega$
Long-term drift	
<ul> <li>In the first month</li> </ul>	< 0.02 % of span in the first month
After one year	< 0.2 % of span after one year
After 5 years	< 0.3 % of span after 5 years
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 +85 °C (-40 +185 °F)
Storage temperature range	-40 +85 °C (-40 +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Construction	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm <sup>2</sup> (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP20

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 07 ATEX 2032X
"Intrinsic safety" type of protection	II 2(1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C
• Type of protection, "equipment is non-arcing"	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connec- tion with RS 232 modem under Windows 95, 98 and 98SE

#### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
  Measuring range: 0 ... 100 °C (32 ... 212 °F)
  Error signal in the event of sensor breakage: 22.8 mA
  Sensor offset: 0 °C (0 °F)
  Damping 0.0 s

# Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

Transmitters for rail mounting

SITRANS TR200 two-wire system, universal

#### Resistance-based sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy	
	Ω	Ω	Ω	
Resistance	0 390	5	0.05	
Resistance	0 2200	25	0.25	

#### Thermocouples

Input	Measuring range	Min. mea- sured span			
	°C/(°F)	°C	(°F)	°C	(°F)
Туре В	100 1820 (212 3308)	100	(180)	2 <sup>1)</sup>	(3.6) <sup>1)</sup>
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.6)
Type D (W3)	0 2300 (32 4172)	100	(180)	1 <sup>2)</sup>	$(1.8)^{2}$
Type E	-200 +1000 (-328 +1832)	50	(90)	1	(1.8)
Type J	-210 +1200 (-346 +2192)	50	(90)	1	(1.8)
Type K	-230 +1370 (-382 +2498)	50	(90)	1	(1.8)
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.8)
Type N	-200 +1300 (-328 +2372)	50	(90)	1	(1.8)
Type R	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Type T	-200 +400 (-328 +752)	40	(72)	1	(1.8)
Type U	-200 +600 (-328 +1112)	50	(90)	2	(3.6)

 $<sup>^{1)}</sup>$  The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

#### mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	μV
mV sensor	-10 +70	2	40
mV sensor	-100 +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

 $<sup>^{2)}</sup>$  The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

Transmitters for rail mounting

## SITRANS TR200 two-wire system, universal

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TR200	
For mounting on a standard DIN rail, two-wire system, 4 to 20 mA, programmable, with electrical isolation, with documentation on MiniDVD	
Without explosion protection	7NG3032-0JN00
With explosion protection to ATEX     ▶      ■	7NG3032-1JN00
Further designs	Order code
Please add "-Z" to Article No. with and specify Order codes(s).	
With test protocol (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>1)</sup>
Measuring point no. (TAG), max. 8 characters	Y17 <sup>2)</sup>
Measuring point descriptor, max. 16 characters	Y23 <sup>2)</sup>
Measuring point message, max. 32 characters	Y24 <sup>2)</sup>
Text on front label, max. 16 characters	Y29 <sup>2)3)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>4)</sup>
Pt100 (IEC) 3-wire	U03 <sup>4)</sup>
Pt100 (IEC) 4-wire	U04 <sup>4)</sup>
Thermocouple type B	U20 <sup>4)5)</sup>
Thermocouple type C (W5)	U21 <sup>4)5)</sup>
Thermocouple type D (W3)	U22 <sup>4)5)</sup>
Thermocouple type E	U23 <sup>4)5)</sup>
Thermocouple type J	U24 <sup>4)5)</sup>
Thermocouple type K	U25 <sup>4)5)</sup>
Thermocouple type L	U26 <sup>4)5)</sup>
Thermocouple type N	U27 <sup>4)5)</sup>
Thermocouple type R	U28 <sup>4)5)</sup>
Thermocouple type S	U29 <sup>4)5)</sup>
Thermocouple type T	U30 <sup>4)5)</sup>
Thermocouple type U	U31 <sup>4)5)</sup>
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>6)</sup>
Fail-safe value 3.6 mA (instead of 22.8 mA)	U36 <sup>2)</sup>

Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 ▶ and TF with TH200 incl. SIPROM T parameterization software With USB connection	7NG3092-8KU
MiniDVD for temperature measuring instru- ► ments for	A5E00364512
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) Text on front plate is not saved in the device.
- 4) For this selection, Y01 must also be selected.
- 5) Internal cold junction compensation is selected as the default for TC.
- 6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

## Ordering example 1:

7NG3032-0JN00-Z Y01+Y17+Y29+U03

Y01: -10 ... +100 °C Y17: TICA123 Y29: TICA123

# Ordering example 2:

7NG3032-0JN00-Z Y01+Y17+Y23+Y29+U25 Y01: -10 ... +100 °C

Y17: TICA123 Y23: TICA123HEAT Y29: TICA123HEAT

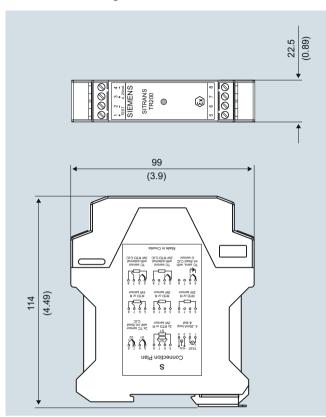
#### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
  Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Transmitters for rail mounting

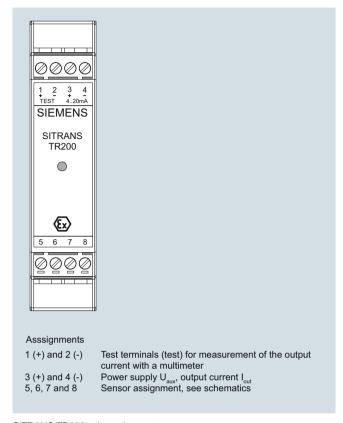
# SITRANS TR200 two-wire system, universal

# Dimensional drawings



SITRANS TR200, dimensions in mm (inch)

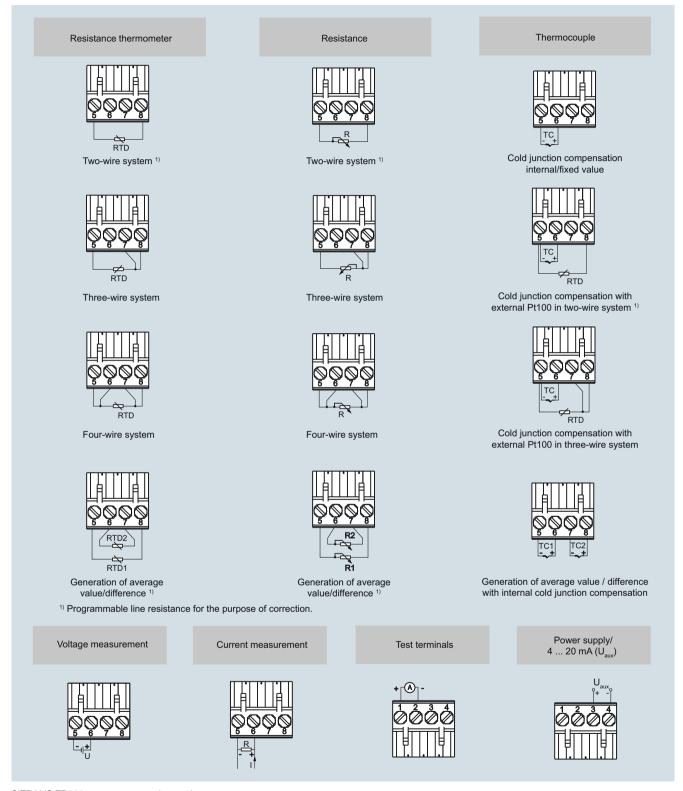
# Schematics



SITRANS TR200, pin assignment

Transmitters for rail mounting

# SITRANS TR200 two-wire system, universal



SITRANS TR200, sensor connection assignment

Transmitters for rail mounting

SITRANS TR300 two-wire system, universal, HART

#### Overview



#### "HART" to beat - the universal SITRANS TR300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over HART

#### Benefits

- Compact design
- · Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- · Self-monitoring
- · Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order code C20), SIL2/3 (with C23)

# Application

SITRANS TR300 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- · Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

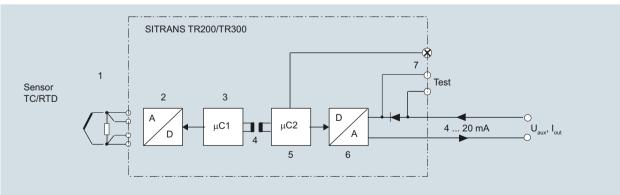
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX).

#### **Function**

The SITRANS TR300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



- Sensor such as resistance thermometer, thermocouple, resistance-based, sensor, mV sensor
- 2 Analog-digital converter
- 3 Microcontroller, secondary circuit
- 4 Electrical isolation
- 5 Microcontroller, primary circuit6 Digital-analog converter
- 7 LED
- J<sub>aux</sub> Auxiliary power supply
  - Output current
  - Test terminals for temporary

connection of an amperemeter

SITRANS TR300 function diagram

# **Temperature Measurement**

Transmitters for rail mounting

# SITRANS TR300 two-wire system, universal, HART

Technical specifications			
Input		Response time T <sub>63</sub>	≤ 250 ms for 1 sensor with open-
Resistance thermometer		riespense time 163	circuit monitoring
Measured variable	Temperature	Open-circuit monitoring	Always active (cannot be dis-
Sensor type	.oporataro		abled)
• to IEC 60751	Pt25 Pt1000	Short-circuit monitoring	can be switched on/off (default value: OFF)
• to JIS C 1604; a=0.00392 K <sup>-1</sup>	Pt25 Pt1000	Measuring range	parameterizable max. $02200 \Omega$
• to IEC 60751	Ni25 Pt1000		(see table "Digital measuring errors")
Special type	over special characteristic (max. 30 points)	Min. measured span	5 25 $\Omega$ (see table "Digital measuring errors")
Sensor factor	0.25 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 1000)	Characteristic curve	Resistance-linear or special characteristic
Units	°C or °F	<u>Thermocouples</u>	
Connection		Measured variable	Temperature
Standard connection	1 resistance thermometer (RTD)	Sensor type (thermocouples)	DISCRIPTION OF THE PROPERTY OF
	in 2-wire, 3-wire or 4-wire system	<ul><li>Type B</li><li>Type C</li></ul>	Pt30Rh-Pt6Rh to DIN IEC 584 W5 %-Re acc. to ASTM 988
<ul> <li>Generation of average value</li> </ul>	2 identical resistance thermometers in 2-wire system for genera-	• Type D	W3 %-Re acc. to ASTM 988
	tion of average temperature	• Type E	NiCr-CuNi to DIN IEC 584
Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)	<ul><li>Type J</li><li>Type K</li></ul>	Fe-CuNi to DIN IEC 584 NiCr-Ni to DIN IEC 584
Interface	1-111020111102-11101)	• Type L	Fe-CuNi to DIN 43710
Two-wire system	Parameterizable line resistance	<ul><li>Type N</li><li>Type R</li></ul>	NiCrSi-NiSi to DIN IEC 584 Pt13Rh-Pt to DIN IEC 584
1 WO WITE SYSTEM	$\leq$ 100 $\Omega$ (loop resistance)	• Type S	Pt10Rh-Pt to DIN IEC 584
Three-wire system	No balancing required	• Type T	Cu-CuNi to DIN IEC 584
<ul> <li>Four-wire system</li> </ul>	No balancing required	• Type U	Cu-CuNi to DIN 43710
Sensor current	≤ 0.45 mA	Units	°C or °F
Response time T <sub>63</sub>	≤ 250 ms for 1 sensor with open- circuit monitoring	Connection  • Standard connection	1 thermocouple (TC)
Open-circuit monitoring	Always active (cannot be	Generation of average value	2 thermocouples (TC)
Short-circuit monitoring	isabled) can be switched on/off (default	Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Measuring range	value: ON) parameterizable (see table	Response time T <sub>63</sub>	≤ 250 ms for 1 sensor with open- circuit monitoring
Main and a superior of the superior	"Digital measuring errors")	Open-circuit monitoring	Can be switched off
Min. measured span	10 °C (18 °F)	Cold junction compensation	
Characteristic curve	Temperature-linear or special characteristic	• Internal	With integrated Pt100 resistance thermometer
Resistance-based sensors  Measured variable	Actual resistance	• External	With external Pt100 IEC 60571
Sensor type	Resistance-based, potentiometers	• External fixed	(2-wire or 3-wire connection)  Cold junction temperature can
Units	Ω		be set as fixed value
Connection	22	Measuring range	parameterizable (see table "Digital measuring errors")
Normal connection	1 resistance-based sensor (R) in	Min. measured span	Min. 40 100 °C (72 180 °F)
	2-wire, 3-wire or 4-wire system	·	(see table "Digital measuring errors")
Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value	Characteristic curve	Temperature-linear or special characteristic
<ul> <li>Generation of difference</li> </ul>	2 resistance thermometers in	mV sensor	
	2-wire system (R1 – R2 or R2 – R1)	Measured variable	DC voltage
Interface	,,	Sensor type	DC voltage source (DC voltage source possible over an exter-
Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	Units	nally connected resistor)
• Three wire evetem	No balancing required	UTIILS	IIIV

Response time  $T_{63}$ 

Open-circuit monitoring

≤ 250 ms for 1 sensor with open-

circuit monitoring

Can be switched off

• Three-wire system

• Four-wire system

Sensor current

No balancing required

No balancing required

≤ 0.45 mA

Transmitters for rail mounting

# SITRANS TR300 two-wire system, universal, HART

		SITRANS TR300 two-w	rire system, universal, HARI
Measuring range	parameterizable max100 1100 mV	Conditions of use	
Min. measured span  Overload capability of the input	2 mV or 20 mV -1.5 +3.5 V DC	Ambient conditions  Ambient temperature range	-40 +85 °C (-40 +185 °F)
Input resistance Characteristic curve	$\geq$ 1 M $\Omega$ Voltage-linear or special characteristic	Storage temperature range Relative humidity Electromagnetic compatibility	-40 +85 °C (-40 +185 °F) < 98 %, with condensation acc. to EN 61326 and NE21
Output Output signal Auxiliary power  Max. load Overrange  Error signal (e.g. following sensor fault) (conforming to NE43) Sample cycle Damping	4 20 mA, 2-wire with communication acc. to HART Rev. 5.9 11 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA) (U <sub>aux</sub> -11 V)/0.023 A 3.6 23 mA, infinitely adjustable (default range: 3.84 20.5 mA) 3.6 23 mA, infinitely adjustable (default value: 22.8 mA) 0.25 s nominal Software filter 1st order 0 30 s	Design Material Weight Dimensions Cross-section of cables Degree of protection to IEC 60529 • Enclosure Certificates and approvals Explosion protection ATEX EC type test certificate • "Intrinsic safety" type of protection	Plastic, electronic module potted 122 g See "Dimensional drawings" Max. 2.5 mm² (AWG 13)  IP20  PTB 07 ATEX 2032X II 2(1) G Ex ia/ib IIC T6/T4
Protection Electrical isolation  Measuring accuracy Digital measuring errors  Reference conditions  • Auxiliary power	(parameterizable) Against reversed polarity Input against output (1 kV <sub>eff</sub> )  see table "Digital measuring errors"	<ul> <li>Type of protection, "equipment is non-arcing"</li> <li>Other certificates</li> <li>Factory setting:</li> <li>Pt100 (IEC 751) with 3-wire ci</li> </ul>	II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C II 3 G Ex nA IIC T6/T4  EAC Ex(GOST), IECEx
Load     Ambient temperature     Warming-up time  Error in the analog output (digital/analog converter)	500 Ω 23 °C > 5 min < 0.025 % of span	<ul> <li>Measuring range: 0 100 °C</li> <li>Error signal in the event of ser</li> <li>Sensor offset: 0 °C (0 °F)</li> <li>Damping 0.0 s</li> </ul>	,

< 0.3 % of span after 5 years

• After 5 years

Transmitters for rail mounting

## SITRANS TR300 two-wire system, universal, HART

#### Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

#### Resistance-based sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

## Thermocouples

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
Туре В	100 1820 (212 3308)	100	(180)	2 <sup>1)</sup>	(3.6) <sup>1)</sup>
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.6)
Type D (W3)	0 2300 (32 4172)	100	(180)	1 <sup>2)</sup>	$(1.8)^{2}$
Туре Е	-200 +1000 (-328 +1832)	50	(90)	1	(1.8)
Type J	-210 +1200 (-346 +2192)	50	(90)	1	(1.8)
Туре К	-230 +1370 (-382 +2498)	50	(90)	1	(1.8)
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.8)
Type N	-200 +1300 (-328 +2372)	50	(90)	1	(1.8)
Type R	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
Туре Т	-200 +400 (-328 +752)	40	(72)	1	(1.8)
Type U	-200 +600 (-328 +1112)	50	(90)	2	(3.6)

 $<sup>^{1)}</sup>$  The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

#### mV sensor

Input	Measuring range	Min. mea- sured span	Digital accuracy
	mV	mV	μV
mV sensor	-10 +70	2	40
mV sensor	-100 +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0,025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

 $<sup>^{2)}</sup>$  The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

Transmitters for rail mounting

# SITRANS TR300 two-wire system, universal, HART

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TR300	
For mounting on a standard DIN rail, two-wire system, 4 20 mA, HART, with electrical isolation, with documentation on MIniDVD	
<ul> <li>Without explosion protection</li> </ul>	7NG3033-0JN00
With explosion protection to ATEX	7NG3033-1JN00
Further designs	Order code
Please add "-Z" to Article No. with and specify Order codes(s).	
With test protocol (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>1)</sup>
Measuring point no. (TAG), max. 8 characters	Y17 <sup>2)</sup>
Measuring point descriptor, max. 16 characters	Y23 <sup>2)</sup>
Measuring point message, max. 32 characters	Y24 <sup>2)</sup>
Text on front label, max. 16 characters	Y29 <sup>2)3)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>4)</sup>
Pt100 (IEC) 3-wire	U03 <sup>4)</sup>
Pt100 (IEC) 4-wire	U04 <sup>4)</sup>
Thermocouple type B	U20 <sup>4)5)</sup>
Thermocouple type C (W5)	U21 <sup>4)5)</sup>
Thermocouple type D (W3)	U22 <sup>4)5)</sup>
Thermocouple type E	U23 <sup>4)5)</sup>
Thermocouple type J	U24 <sup>4)5)</sup>
Thermocouple type K	U25 <sup>4)5)</sup>
Thermocouple type L	U26 <sup>4)5)</sup>
Thermocouple type N	U27 <sup>4)5)</sup>
Thermocouple type R	U28 <sup>4)5)</sup>
Thermocouple type S	U29 <sup>4)5)</sup>
Thermocouple type T	U30 <sup>4)5)</sup>
Thermocouple type U	U31 <sup>4)5)</sup>
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>6)</sup>
Fail-safe value 3.6 mA (instead of 22.8 mA)	U36 <sup>2)</sup>

Accessories	Article No.
MiniDVD for temperature measuring instru- ► ments	A5E00364512
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	
HART modem	
• With USB connection	7MF4997-1DB
Simatic PDM operating software	See Section 8

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) Text on front plate is not saved in the device.
- 4) For this selection, Y01 must also be selected.
- <sup>5)</sup> Internal cold junction compensation is selected as the default for TC.
- 6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must

Supply units see Chapter "Supplementary Components".

#### Ordering example 1:

7NG3033-0JN00-Z Y01+Y17+Y29+U03

Y01: -10 ... +100 °C Y17: TICA123 Y29: TICA123

#### Ordering example 2:

7NG3033-0JN00-Z Y01+Y17+Y23+Y29+U25

Y01: -10 ... +100 °C Y17: TICA123 Y23: TICA123HEAT Y29: TICA123HEAT

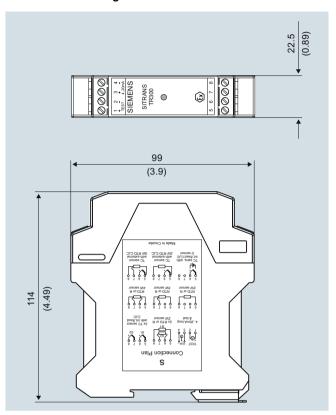
#### Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
  Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Transmitters for rail mounting

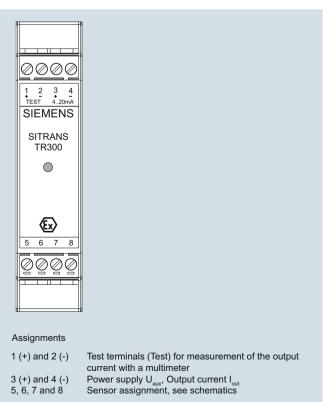
# SITRANS TR300 two-wire system, universal, HART

# Dimensional drawings



SITRANS TR300, dimensions in mm (inch)

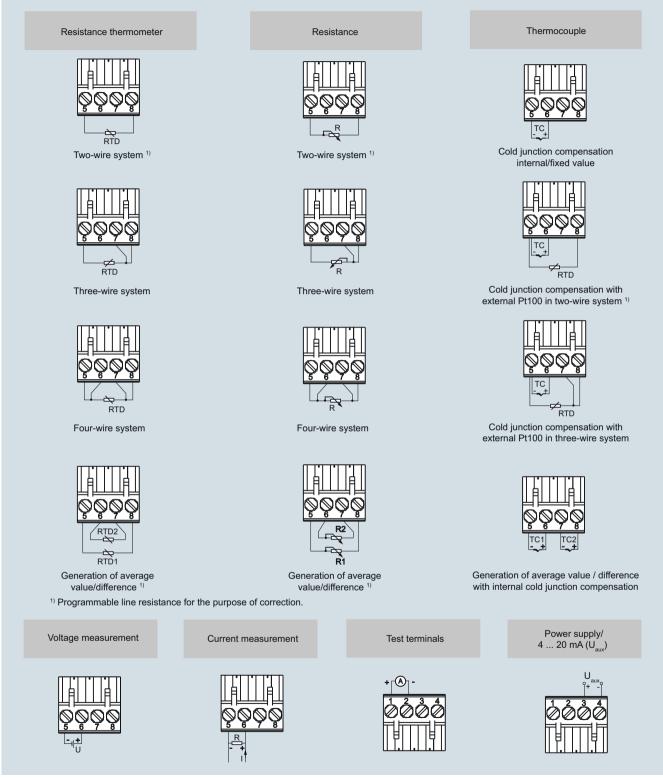
# Schematics



SITRANS TR300, pin assignment

Transmitters for rail mounting

# SITRANS TR300 two-wire system, universal, HART



SITRANS TR300, sensor connection assignment

Transmitters for rail mounting

#### SITRANS TW four-wire system, universal, HART

#### Overview



#### The user-friendly transmitters for the control room

The SITRANS TW universal transmitter is a further development of the service-proven SITRANS T for the 4-wire system in a mounting rail housing. With numerous new functions it sets new standards for temperature transmitters.

With its diagnostics and simulation functions the SITRANS TW provides the necessary insight during commissioning and operation. And using its HART interface the SITRANS TW can be conveniently adapted with SIMATIC PDM to every measurement task

All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

## Application

The SITRANS TW transmitter is a four-wire rail-mounted device with a universal input circuit for connection to the following sensors and signal sources:

- · Resistance thermometer
- Thermocouples
- Resistance-based sensors/potentiometers
- mV sensors
- As special version:
  - V sources
  - Current sources

The 4-wire rail-mounted SITRANS TW transmitter wire is designed for control room installation. It must not be mounted in potentially explosive atmospheres.

All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

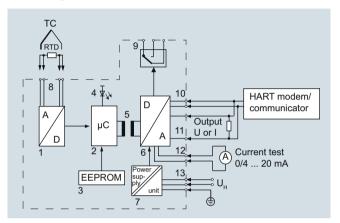
#### Function

#### Features

- Transmitter in four-wire system with HART interface
- Housing can be mounted on 35 mm rail or 32 mm G rail
- Screw plug connector
- · All circuits electrically isolated
- Output signal: 0/4 to 20 mA or 0/2 to 10 V
- Power supplies: 115/230 V AC/DC or 24 V AC/DC
- Explosion protection [EEx ia] or [EEx ib] for measurements with sensors in the hazardous area
- Temperature-linear characteristic for all temperature sensors

- Temperature-linear characteristic can be selected for all temperature sensors
- Automatic correction of zero and span
- Monitoring of sensor and cable for open-circuit and short- circuit
- Sensor fault and/or limit can be output via an optional sensor fault/limit monitor
- Hardware write protection for HART communication
- Diagnostic functions
- · Slave pointer functions
- SIL1

#### Mode of operation



The signal output by a resistance-based sensor (two-wire, three-wire, four-wire system), voltage source, current source or ther-mocouple is converted by the analog-to-digital converter (1, function diagram) into a digital signal. This is evaluated in the microcontroller (2), corrected according to the sensor characteristic, and converted by the digital-to-analog converter (6) into an output current (0/4 to 20 mA) or output voltage (0/2 to 10 V). The sensor characteristics as well as the electronics data and the data for the transmitter parameters are stored in the non-volatile memory (3).

AC or DC voltages can be used as the power supply (13). Any terminal connections are possible for the power supply as a result of the bridge rectifier in the power supply unit. The PE conductor is required for safety reasons.

A HART modem or a HART communicator permit parameterization of the transmitter using a protocol according to the HART specification. The transmitter can be directly parameterized at the point of measurement via the HART output terminals (10).

The operation indicator (4) identifies a fault-free or faulty operating state of the transmitter. The limit monitor (9) enables the signaling of sensor faults and/or limit violations. In the case of a current output, the current can be checked on a meter connected to test socket (12).

#### Diagnosis and simulation functions

The SITRANS TW comes with extensive diagnosis and simulation functions.

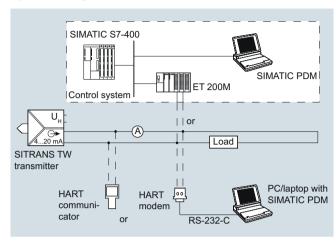
Physical values can be defined with the simulation function. It is thus possible to check the complete signal path from the sensor input to inside the control system without additional equipment. The slave pointer functions are used to record the minimum and maximum of the plant's process variable.

Transmitters for rail mounting

#### SITRANS TW four-wire system, universal, HART

# Integration

#### System configuration



Possible system configurations

The SITRANS TW transmitter as a four-wire rail-mounted device can be used in a number of system configurations: as a standalone version or as part of a complex system environment, e.g. with SIMATIC S7. All device functions are available via HART communication.

Communication options through the HART interface:

- HART communicator
- HART modem connected to PC/laptop on which the appropriate software is available, e.g. SIMATIC PDM
- HART-compatible control system (e.g. SIMATIC S7-400 with ET 200M)

# Technical specifications

#### Input

Selectable filters to suppress the line frequency

Resistance thermometer

Measured variable Measuring range Measuring span

Sensor type

• Acc. to IEC 751

• Acc. to JIS C 1604-81

• to DIN 43760

• Special type ( $R_{RTD} \le 500 \Omega$ )

Characteristic curve

Type of connection

Interface

Measuring range limits

Sensor breakage monitoring

Sensor short-circuit monitoring

Resistance-based sensor, potenti-

ometer

Measured variable Measuring range Measuring span Characteristic curve

Type of connection

\*\*

Interface Input range

Sensor breakage monitoring

Sensor short-circuit monitoring

50 Hz, 60 Hz, also 10 Hz for special applications (line frequency filter is similar with measuring fre-

quency)

Temperature

Parameterizable

min. 25 °C (45 °F) x 1/scaling fac-

tor

Pt100 (IEC 751)

Pt100 (JIS C1604-81)

Ni100 (DIN 43760)

Multiples or parts of the defined characteristic values can be parameterized (e.g. Pt500, Ni120)

Temperature-linear, resistance-linear or customer-specific

Normal connection

• Sum or parallel connection

Mean-value or differential con-

nection

2, 3 or 4-wire circuit

Depending on type of connected thermometer (defined range of resistance thermometer)

Monitoring of all connections for open-circuit (function can be switched off)

Parameterizable response threshold (function can be switched off)

Actual resistance

Parameterizable

min. 10  $\Omega$ 

Resistance-linear or customer-

specific

Normal connection

• Differential connection

• Mean-value connection

2, 3 or 4-wire circuit

0 ... 6000 Ω;

with mean-value and difference circuits: 0 ... 3000  $\Omega$ 

Monitoring of all connections for open-circuit (function can be

switched off)

Parameterizable response threshold (function can be switched off)

Transmitters for rail mounting

## SITRANS TW four-wire system, universal, HART

Thermocouples		μA-, mA sources	
Measured variable	Temperature	Measured variable	DC voltage
Measuring range	Parameterizable	Measuring range	Parameterizable
Measuring span	min. 50 °C (90 °F) x 1/scaling fac-	Characteristic curve	Current-linear or customer- specific
	tor	Input range/min. span	
Measuring range limits	Depend. on type of thermocouple element	<ul><li>Devices with 7NG3242-xxxx4</li></ul>	-12 +100 μA/0.4 μA
Thermocouple element	Type B: Pt30 %Rh/Pt6 %Rh	• Devices with 7NG3242-xxxx5	-120 +1000 μΑ/4 μΑ
memocoapio diamant	(DIN IEC 584)	<ul><li>Devices with 7NG3242-xxxx6</li></ul>	-1.2 +10 mA/0.04 mA
	Type C: W5 %-Re (ASTM 988)	• Devices with 7NG3242-xxxx7 or	-12 +100 mA/0.4 mA
	Type D: W3 %-Re (ASTM 988)	7NG3242-xxxx <b>0</b> with U/I plug	100 1000 1/4 1
	Type E: NiCr/CuNi (DIN IEC 584)	• Devices with 7NG3242-xxxx8	-120 +1000 mA/4 mA
	Type J: Fe/CuNi (DIN IEC 584)	Sensor breakage monitoring	Not possible
	Type K: NiCr/Ni (DIN IEC 584)	Output	
	Type L: Fe-CuNi (DIN 43710)	Output signal	Load-independent direct current 0/4 20 mA, can be switched to
	Type N: NiCrSi-NiSi (DIN IEC 584)		load-independent DC voltage
	Type R: Pt13 %Rh/Pt (DIN IEC 584)	Current 0/4 20 mA	0/2 10 V using plug-in jumpers
	Type S: Pt10 %Rh/Pt (DIN IEC 584)	Overrange	-0.5 +23.0 mA, continuously adjustable
	Type T: Cu/CuNi (DIN IEC 584)  Type U: Cu/CuNi (DIN 43710)	<ul> <li>Output range following sensor fault (conforming to NE43)</li> </ul>	-0.5 +23.0 mA, continuously adjustable
	Special type	• Load	≤ 650 Ω
	$(-10 \text{ mV} \le \text{UTC} \le 100 \text{ mV})$	<ul> <li>No-load voltage</li> </ul>	≤ 30 V
Characteristic curve	Temperature-linear, voltage-linear	Voltage 0/2 10 V	
To a confidence of the confidence	or customer-specific	<ul><li>Overrange</li></ul>	-0.25 +10.75 V, continuously
Type of connection	<ul><li>Normal connection</li><li>Averaging connection</li></ul>	• Outrout range fallowing concer	adjustable
	Mean-value connection	<ul> <li>Output range following sensor fault</li> </ul>	-0.25 +10.75 V, continuously adjustable
	Differential connection	Load resistance	≥ 1 kΩ
Cold junction compensation	None, internal measurement,	Load capacitance	≤ 10 nF
	external measurement or pre- defined fixed value	Short-circuit current	≤ 100 mA (not permanently short-circuit-proof)
Sensor breakage monitoring	Function can be switched off	Electrical damping	
mV sensors		- adjustable time constant $T_{63}$	0 100 s, in steps of 0.1 s
Measured variable	DC voltage	Current source/voltage source	Continuously adjustable within
Measuring range	Parameterizable		the total operating range
Measuring span	min. 4 mV	Sensor fault/limit signalling	By operation indicator, relay output or HART interface
Input range	-120 +1000mV	Operation indicator	Flashing signal
Characteristic curve	Voltage-linear or customer-spe- cific	Limit violation	Flashing frequency 5 Hz
Overload capacity of inputs	max. ± 3.5 V	Sensor fault monitoring	Flashing frequency 1 Hz
Input resistance	≥ 1 MΩ	Relay outputs	Either as NO or NC contact with
Sensor current	Approx. 180 μA	, ,	1 changeover contact
Sensor breakage monitoring	Function can be switched off	<ul> <li>Switching capacity</li> </ul>	≤ 150 W, ≤ 625 VA
V sources		<ul> <li>Switching voltage</li> </ul>	≤ 125 V DC, ≤ 250 V AC
Measured variable	DC voltage	<ul> <li>Switching current</li> </ul>	≤ 2.5 A DC
Measuring range	Parameterizable	Sensor fault monitoring	Signalling of sensor or line break-
Characteristic curve	Voltage-linear or customer-spe-	Limit monitoring	age and sensor short-circuit
	cific	Operating delay	0 10 s
Input range/min. span		Monitoring functions of limit	Sensor fault (breakage and/or
<ul> <li>Devices with 7NG3242-xxxx1 or 7NG3242-xxxx0 with U/I plug</li> </ul>	-1.2 + 10 V/0.04 V	module	short-circuit)  Lower and upper limit
<ul><li>Devices with 7NG3242-xxxx2</li></ul>	-12 +100 V/0.4 V		Window (combination of lower
<ul><li>Devices with 7NG3242-xxxx3</li></ul>	-120 +140 V/4.0 V		and upper limits)
Sensor breakage monitoring	Not possible		<ul> <li>Limit and sensor fault detection can be combined</li> </ul>

• Hysteresis

- 8.0 mA, continuously
- 3.0 mA, continuously

- 0.75 V, continuously
- not permanently short-

- 625 VA
- C, ≤ 250 V AC

- ault (breakage and/or cuit)
- nd upper limit
- combination of lower èr limits)
- Limit and sensor fault detection can be combined

Parameterizable between 0 and 100 % of measuring range

Transmitters for rail mounting

# SITRANS TW four-wire system, universal, HART

		Similario i il iodi il	me system, universal, marri
Auxiliary power		Certificates and approvals	
Universal power supply unit	115/230 V AC/DC or 24 V AC/DC	Intrinsic safety	
Tolerance range for power supply		• for 7NG3242-x <b>A</b> xxx	II (1) G [Ex ia Ga] IIC
• With 115/230 V AC/DC PSU	80 300 V DC; 90 250 V AC	• for 7NG3242-x <b>B</b> xxx	II (1) D [Ex ia Da] IIIC
• With 24 V AC/DC PSU	18 80 V DC; 20.4 55.2 V AC (in each case interruption-resis-	EC type-examination certificate	TÜV (German Technical Inspectorate) 01 ATEX 1675
	tant up to 20 ms in the complete tolerance range)	Other certificates	EAC Ex(GOST)
Tolerance range for mains frequency	47 63 Hz	Conditions of use	
Power consumption with	66 112	Installation conditions	
• 230 V AC	≤ 5 VA	Location (for devices with explosion	
• 230 V DC	< 5 W	protection)	Outside the petentially explosive
• 24 V AC	≤ 5 VA	Transmitters	Outside the potentially explosive atmosphere
• 24 V DC	≤ 5 W	• Sensor	Within the potentially explosive
Electrically isolated			atmosphere zone 1 (also in zone 0 in conjunction with the pre-
Electrically isolated circuits	Input, output, power supply and sensor fault/limit monitoring out-		scribed protection requirements for the sensor)
	put are electrically isolated from	Ambient conditions	
	one another. The HART interface is electrically connected to the	Permissible ambient temperature	-25 +70 °C (-13 +158 °F)
	output.	Permissible storage temperature	-40 +85 °C (-40 +185 °F)
Working voltage between all electri-	The voltage U <sub>rms</sub> between any	Climatic class	
cally isolated circuits	two terminals must not exceed 300 V	Relative humidity	5 95 %, no condensation
Measuring accuracy		Design	
Accuracy		Weight	Approx. 0.24 kg (0.53 lb)
• Error in the internal cold junction	≤ 3 °C ± 0.1 °C / 10 °C	Enclosure material	PBT, glass-fibre reinforced
_ , , , , , , , , , ,	(≤ 5.4 °F ± 0.18 °F / 18 °F)	Degree of protection to IEC 529	IP20
<ul> <li>Error of external cold junction terminal 7NG3092-8AV</li> </ul>	≤ 0.5 °C ± 0.1 °C / 10 °C (≤ 0.9 °F ± 0.18 °F / 18 °F)	Degree of protection to VDE 0100	Protection class I
Digital output	See "Digital error"	Type of installation	35-mm DIN rail (1.38 inch) (EN 50022) or 32-mm G-type rail
<ul> <li>Analog output I<sub>AN</sub> or U<sub>AN</sub></li> </ul>	≤ 0.05 % of the span plus digital error	Electrical connection / process con-	(1.26 inch) (EN 50035)
Influencing effects (referred to the digital output)	Compared to the max. span:	nection	2.5 mm <sup>2</sup> (0.01 inch <sup>2</sup> )
Temperature drift	≤ 0.08 % / 10 °C (≤ 0.08 % /18 °F)	Parameterization interface	LIANT I FO
	≤ 0.2 % in the range -10 +60 °C (14 140 °F)	Protocol	HART, version 5.9
Long-term drift	≤ 0.1 % / year	Load with connection of	000 050 0
Influencing effects referred to the	Compared to the span:	HART communicator	230 650 Ω
analog output I <sub>AN</sub> or U <sub>AN</sub>	·	HART modem     Coffee and for BO//southern	230 500 Ω
Temperature drift	≤ 0.08 % / 10°C (≤ 0.08 % / 18 °F) ≤ 0.2 % in the range -10 +60 °C (14 140 °F)	Software for PC/laptop	SIMATIC PDM version V5.1 and later
<ul><li>Power supply</li></ul>	≤ 0.05 % / 10 V		
Load with current output	$\leq$ 0.05 % on change from 50 $\Omega$ to 650 $\Omega$		
Load with voltage output	≤ 0.1 % on change in the load current from 0 mA to 10 mA		
<ul> <li>Long-term drift (start-of-scale value, span)</li> </ul>	≤ 0.03 % / month		
Decrease times (T. without -1till	400-		

Response time ( $T_{63}$  without electrical damping)

Electromagnetic compatibility

≤ 0.2 s

According to EN 61 326 and NAMUR NE21

Transmitters for rail mounting

# SITRANS TW four-wire system, universal, HART

# Digital error

Resistance thermometer

Input	Measuring range	Max. permissi- ble line resis- tance	Digital error
	°C / (°F)	Ω	°C / (°F)
IEC 751			
• Pt10	-200 +850 (-328 +1562)	20	3.0 (5.4)
• Pt50	-200 +850 (-328 +1562)	50	0.6 (1.1)
• Pt100	-200 +850 (-328 +1562)	100	0.3 (0.5)
• Pt200	-200 +850 (-328 +1562)	100	0.6 (1.1)
• Pt500	-200 +850 (-328 +1562)	100	1.0 (1.8)
• Pt1000	-200 +850 (-328 +1562)	100	1.0 (1.8)
JIS C 1604-81			
• Pt10	-200 +649 (-328 +1200)	20	3.0 (5.4)
• Pt50	-200 +649 (-328 +1200)	50	0.6 (1.1)
• Pt100	-200 +649 (-328 +1200)	100	0.3 (0.5)
DIN 43760			
• Ni50	-60 +250 (-76 +482)	50	0.3 (0.5)
• Ni100	-60 +250 (-76 +482)	100	0.3 (0.5)
• Ni120	-60 +250 (-76 +482)	100	0.3 (0.5)
• Ni1000	-60 +250 (-76 +482)	100	0.3 (0.5)

#### Resistance-based sensors

Input	Measuring range	Max. permissi- ble line resis- tance	Digital error		
	Ω	Ω	Ω		
Resistance	0 24	5	0.08		
(linear)	0 47	15	0.06		
	0 94	30	0.06		
	0 188	50	0.08		
	0 375	100	0.1		
	0 750	100	0.2		
	0 1500	75	1.0		
	0 3000	100	1.0		
	0 6000	100	2.0		

#### Thermocouples

Measuring range	Digital error 1)
°C / (°F)	°C (°F)
100 1820 (212 3308)	3 (5.4)
0 2300 (32 4172)	2 (3.6)
0 2300 (32 4172)	1 (1.8)
-200 +1000 (-328 +1832)	1 (1.8)
-210 +1200 (-346 +2192)	1 (1.8)
-200 +1372 (-328 +2501)	1 (1.8)
-200 +900 (-328 +1652)	2 (3.6)
-200 +1300 (-328 +2372)	1 (1.8)
-50 +1760 (-58 +3200)	2 (3.6)
-50 +1760 (-58 +3200)	2 (3.6)
-200 +400 (-328 +752)	1 (1.8)
-200 +600 (-328 +1112)	2 (3.6)
	°C / (°F)  100 1820 (212 3308) 0 2300 (32 4172) 0 2300 (32 4172) -200 +1000 (-328 +1832) -210 +1200 (-346 +2192) -200 +1372 (-328 +2501) -200 +1300 (-328 +1652) -200 +1300 (-328 +2372) -50 +1760 (-58 +3200) -50 +1760 (-58 +3200) -200 +400 (-328 +752) -200 +600

<sup>1)</sup> Accuracy data refer to the largest error in the complete measuring range Voltage/current sources

Input	Measuring range	Digital error
mV sources (linear)	mV	μV
	-1 +16	35
	-3 +32	20
	-7 +65	20
	-15 +131	50
	-31 +262	100
	-63 +525	200
	-120 +1000	300
V sources (linear)	V	mV
	-1.2 +10	3
	-12 +100	30
	-120 +140	300
μA/mA sources (linear)	μ <b>A/mA</b>	μΑ
	-12 +100 μA	0.05
	-120 +1000 μA	0.5
	-1.2 +10 mA	5
	-12 + 100 mA	50
	-120 +1000 mA	500

Transmitters for rail mounting

SITRANS TW four-wire system, universal, HART

# Ordering examples

Desired transmitter	Parar	neter:	Ordering	
	Standard	Special	design	
Example 1:  SITRANS TW, transmitter in four-wire system  • with explosion protection ATEX  • 230 V AC/DC power supply  • current output  • without sensor fault/limit monitor  - Sensor PT100, three-wire circuit  - Measuring range 0 150 °C  - Temperature-linear characteristic  - Filter time 1 s  - Output 4 20 mA, line filter 50 Hz  - Output driven to full-scale in event of like breakage	X X X X X		7NG3242-1AA00 (stock item)	
Example 2:  SITRANS TW, transmitter in four-wire system  • without explosion protection • 24 V AC/DC power supply • Voltage output • Sensor fault/limit monitor - Rating plate in English - Sensor NiCr/Ni, type K - Cold junction internal - Measuring range 0 950 °C - Temperature-linear characteristic - Filter time 1 s - Output 0 10 V, line filter 50 Hz - Output driven to full-scale in event of like breakage - Limit monitoring switched off	x x x x	S76 A05 Y30 H10	7NG3242-0BB10-Z Y01 + S76 + A05 + Y30 + H10 Y01: see Order code Y30: MA=0; ME= 950; D=C	
Example 3:  SITRANS TW, transmitter in four-wire system  • without explosion protection • 24 V AC/DC power supply • Current output • without sensor fault/limit monitor • Voltage input, measuring range -1.2 V +10 V • Measuring range 0 5 V • Source-proportional characteristic • Filter time 10 s • Output 0 20 mA, line filter 60 Hz • No monitoring for sensor fault	X (X)	A40 Y32 G07 H11 J03	7NG3242-0BA01-Z Y01 + A40 + Y32 + G07 + H11 + J03 Y01: see Order code Y32: MA=0; ME= 5; D=V	

# Ordering information

The article number structure shown below is used to specify a fully functioning transmitter. The selection of the operating data (type of source, measuring range, characteristic etc.) is made according to the following rules:

- Operating data already set in factory to default values:
   The default settings can be obtained from the list of parameterizable operating data (see "Special operating data"). The presets can be modified by the customer to match the requirements precisely.
- Operating data set on delivery according to customer requirements:

Supplement the Article No. by "-Z" and add the Order code "Y01". The operating data to be set can be obtained from the list of parameterize operating data. The Order codes A  $\blacksquare$  to K  $\blacksquare$  for operating data to be set need only be specified in the order if they deviate from the default setting.

The default setting is used if no Order code is specified for operating data.

The selected parameters are printed on the transmitter's rating plate.

Transmitters for rail mounting

# SITRANS TW four-wire system, universal, HART

Selection and Ordering data		Article No.		_
SITRANS TW universal transmitter		7NG3242-		
for rail mounting, in four-wire system (order instruction manual separately)  Click on the Article No. for the online con				
figuration in the PIA Life Cycle Portal.				
Explosion protection Without	<b>&gt;</b>		0	
For inputs [EEx ia] or [EEx ib]	<b>&gt;</b>		1	
Power supply 115/230 V AC/DC 24 V AC/DC	<b>&gt;</b> •		A B	
Output signal				
0/4 20 mA (can be switched to 0/2 10 V) 0/2 10 V (can be switched to 0/2 10 V (can be switched to 0/4 20 V (can	<b>&gt;</b>		A B	
0/4 20 mA) Sensor fault/limit monitor				
Without (retrofitting not possible) Relay with changeover contact	<b>&gt;</b>		0 1	
Input for Temperature sensor, resistance-based sensor and mV sensor with measuring range -120 +1000 mV DC and with U/I plug Voltage input (V sources) 1) Measuring range:	<b>&gt;</b>		(	0
• -1.2 +10 V DC  • -12 +10 V DC (not Ex version)  • -120 +140 V DC (not Ex version)  Current input (μA, mA sources) 1)  Measuring range:			2	1 2 3
• -12 +100 μA DC • -120 +1000 μA DC • -1.2 +10 mA DC • -12 +100 mA DC • -120 +1000 mA DC			; ;	4 5 6 7 8
Further designs Please add "-Z" to Article No. and specify Order code(s) (see "List of parameterizable operating data").		Order code		
Customer-specific setting of operating data (see "List of parameterizable operating data")  Note:		Y01		
Meas. point description (max. 16 char.) Text on front of device (max. 32 char.) HART tag (max. 8 characters) With test report		Y23 Y24 Y25 P01		
With shorting plug to HART communication for 0 mA or 0 V		S01		
With plug for external cold junction compensation  With U/I plug (-1.2 +10 V DC or -12 +100 mA)	-	S02 S03		
Language of rating plate (together with Y01 Order code only)				
<ul><li>Italian</li><li>English</li><li>French</li><li>Spanish</li></ul>		\$72 \$76 \$77 \$78		

1)	Observe	max.	values	with	Ex	version.
----	---------	------	--------	------	----	----------

Available ex stock.

Selection and Ordering data		Article No.
Accessories		
MiniDVD for temperature measuring instruments	•	A5E00364512
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software		
Instruction Manual for SITRANS TW		
German/English	$\blacktriangleright$	A5E00054075
French/Italian/Spanish	$\blacktriangleright$	A5E00064515
Cold junction terminal	<b></b>	7NG3092-8AV
<b>U/I plug</b> (-1.2 +10 V DC pr -12 +100 mA)	<b>&gt;</b>	7NG3092-8AW
SIMATIC PDM operating software		see Chapter 8
HART modem		
With USB interface	<b></b>	7MF4997-1DB

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Transmitters for rail mounting

SITRANS TW four-wire system, universal, HART

# List of parameterizable operating data (Order codes A ■ ■ + B ■ ■ ... E ■ ■)

Operating data	a acc. to default settin	ıg	Article No. with Order	code	: 7NG3242 - <b></b>	<b>■</b> -Z \	′01			
Order codes: A ■ ■ E			+		+		+		+	
Sensor										
Thermocouples Type	Temperature range		Connection		Cold junction compensation				Measuring ranges	
B: Pt30 %Rh/Pt6 %Rh C:W5 %Re D:W3 %Re E:NiCr/CuNi J:Fe/CuNi (IEC) K:NiCr/Ni L: Fe/CuNi (DIN) N:NiCrSi/NiSi R:Pt13 %Rh/Pt S:Pt10 %Rh/Pt T:Cu/CuNi (IEC) U:Cu/CuNi (DIN)	0 1820 °C 0 2300 °C 0 2300 °C -200 +1000 °C -210 +1200 °C -200 +1372 °C -200 +1300 °C -200 +1300 °C -50 +1760 °C -200 +400 °C -200 +600 °C	A 0 0 A 0 1 A 0 2 A 0 3 A 0 4 A 0 5 A 0 6 A 0 7 A 0 8 A 0 9 A 1 0	n = 10 Difference <sup>2)</sup> Diff1 Diff2 Mean-val. <sup>2)</sup> MW		50 °C	C 0 0 C 1 0 C 2 0 C 2 2 C 2 5 C 2 6 C 2 7 Y 1 0 Y 1 1			-30 +60 °C -20 +20 °C 0 40 °C 0 80 °C 0 100 °C 0 120 °C 0 150 °C 0 250 °C 0 250 °C 0 350 °C	E 0 0 E 0 1 E 0 2 E 0 3 E 0 4 E 0 5 E 0 6 E 0 7 E 0 8 E 0 9 E 1 0
									0 400 °C	E 1 2
Resistance thermome (or max. permissible lir "Technical specification	ne resistance see		Connection		Connection		Line resis- tance <sup>3)</sup>		0 450 °C 0 500 °C 0 600 °C	E 1 3 E 1 4 E 1 5
Pt100 (DIN IEC) Pt100 (JIS) Ni100 (DIN)	-200 +850 °C -200 +649 °C -60 +250 °C			B 1 0 B 2 1 B 2 2	3-wire-system 4-wire-system		10 Ω 20 Ω 50 Ω	D 1 0 D 2 0 D 5 0	0 700 °C 0 800 °C 0 900 °C 0 1000 °C 0 1200 °C 0 1400 °C 0 1400 °C 0 1500 °C 100 200 °C 100 200 °C 100 300 °C 200 400 °C 200 500 °C 300 600 °C 500 1000 °C 500 1600 °C	E1617 E188 E199 E220 E222 E225 E225 E227 E228 E2331 E334 E335 E335 E335 E335 E335 E335 E335
Resistance-based sen	sors, potentiome-		Connection		Connection		Line resis-		Measuring ranges	
(or max. permissible lir "Technical specification		A 3 0	Standard Difference <sup>2)</sup> Diff1 Diff2 Mean val. <sup>2)</sup> MW	B 5 1	2-wire-system 3-wire-system 4-wire-system			D 1 0 D 2 0 D 5 0	0 100 Ω 0 200 Ω 0 500 Ω 0 1000 Ω	E 4 0 E 4 1 E 4 2 E 4 3 E 4 4 E 4 5 E 4 6 Y 3 1
2) See "Circuit diagrams 3) Line resistance of cha "Technical specificati 4) n = number of resista 5) 1/n = number of resis 6) Combination of series 7) Operating data: see "	ocouple elements to be "for meaning of type of annels 1 and 2, for max ons" (only with C32, no nce thermometers to be tance thermometers to a and parallel connectic Special operating data	circuit . perm t with ( e conr be co on of re	ected in series sissible line resistance sec33 and C34) nected in series nnected in parallel esistance thermometers		No. 7NG 3242 - ■ ■	0 1 2 3 4 5 6 7 8	-Z Y01	-1,2 -120 -12 -120 -1,2 -12	+1000 mV +10 V <sup>10</sup> ) +100 V <sup>10</sup> ) +140 V <sup>10</sup> ) +100 µA <sup>10</sup> ) +100 mA <sup>10</sup> ) +100 mA <sup>10</sup> ) +100 mA <sup>10</sup> ) idl range <sup>7</sup> )	E 5 0
9) The max. permissible	ed in devices with explo	accor	ding to conformity certifi-	-				Spec	a. rango	. 02

Transmitters for rail mounting

# SITRANS TW four-wire system, universal, HART

# List of parameterizable operating data (Order codes F ■ ■ ... K ■ ■)

Operating	Operating data according to default setting  Article No. with Order code: 7NG3242 - ■■■■ -Z Y01											
Order codes: F	-	- I	+		+	WIEIT C	+		+			
Sensor												
Thermocouple el	ements		Voltage measure- ment		Filter time <sup>1)</sup>		Output sig- nal and line filter <sup>2)</sup>		Failure signal		Limit monitor <sup>3)</sup>	
Туре	Temperature range		mem				inter ·					
B: Pt30 %Rh/ C:W5 %Re D:W3 %Re E:NiCr/CuNi J:Fe/CuNi (IEC) K:NiCr/Ni L: Fe/CuNi (DIN) N:NiCrSi/NiSi R:Pt13 %Rh/Pt S:Pt10 %Rh/Pt T:Cu/CuNi (IEC) U:Cu/CuNi (DIN)	0 1820 °C 0 2300 °C 0 2300 °C -200 +1000 °C -210 +1200 °C -200 +1372 °C -200 +1300 °C -50 +1760 °C -50 +1760 °C -200 +400 °C -200 +600 °C	A 0 0 A 0 1 A 0 2 A 0 3 A 0 4 A 0 5 A 0 6 A 0 7 A 0 8 A 0 9 A 1 0 A 1 1	linear Voltage-		0 s 0.1 s 0.2 s 0.5 s 1 s 2 s 5 s 10 s 20 s 50 s 100 s Special time 5)	G 0 1 G 0 2 G 0 3 G 0 4 G 0 5 G 0 6 G 0 7 G 0 8 G 0 9 G 1 0	4 20 mA/ 2 10 V with line filter: 50 Hz 60 Hz 10 Hz <sup>4)</sup> 0 20 mA/ 0 10 V with line filter: 50 Hz 60 Hz 10 Hz	H 0 0 H 0 1 H 0 2	with line break-age/fault:  to full scale to start of scale hold last value  no monitoring  Safety value <sup>5)</sup>	J 0 0 J 0 1 J 0 2 J 0 3 Y 6 0	Limit monitor- ing ineffective (but sensor fault signalling with closed- circuit opera- tion)  Effective <sup>5)</sup>	Y70
	line resistances see		Voltage measure-		Filter time <sup>1)</sup>		Output sig- nal and line		Failure signal		Limit monitor <sup>3)</sup>	
"Technical specific Pt100 (DIN IEC) Pt100 (JIS)	-200 +850 °C -200 +649 °C	A 2 0 A 2 1	ment Temperature-linear	F 0 0	same as for thermocou- ple ele-		filter <sup>2)</sup> same as for thermocou-		with line breakage/fault:		same as for thermocouple elements	
Ni100 (DIN)	-60 +250 °C		Resistance- linear	F 2 0	ments		ple elements		to full scale to start of scale hold last value	J 0 0 J 0 1 J 0 2		
									no monitoring	J 0 3		
									Safety value 5)	Y 6 0		
									with line break- age or short-cir- cuit/fault: to full scale to start of scale hold last value no monitoring	J10 J11 J12 J13		
									Safety value 5)	Y 6 1		
Resistance-based ometers	sensors, potenti-		Voltage measure- ment		Filter time <sup>1)</sup> same as for		Output sig- nal and line filter <sup>2)</sup>		Failure signal		Limit monitor <sup>3)</sup> same as for	
(max. permissible "Technical specific	line resistances see cations")	A 3 0	Resistance- linear	F 2 0			same as for thermocou- ple elements		with line break- age/fault: to full scale to start of scale hold last value	J00 J01 J02 J03	thermocouple elements	
mV, V and μA, mA	\ sources	A 4 0	Voltage		Filter		Output sig-		Safety value 5)	Y 6 0	Limit	
, pr ,	3		measure- ment	F 3 0	time <sup>1)</sup> same as for		nal and line filter <sup>2</sup> ) same as for thermocou- ple elements				monitor 3) same as for thermocouple elements	

Software filter to smooth the result
 Filter to suppress line disturbances on the measured signal.
 If signalling relay present
 for special applications
 Operating data: see "Special operating data"

# **Temperature Measurement** Transmitters for rail mounting

SITRANS TW four-wire system, universal, HART

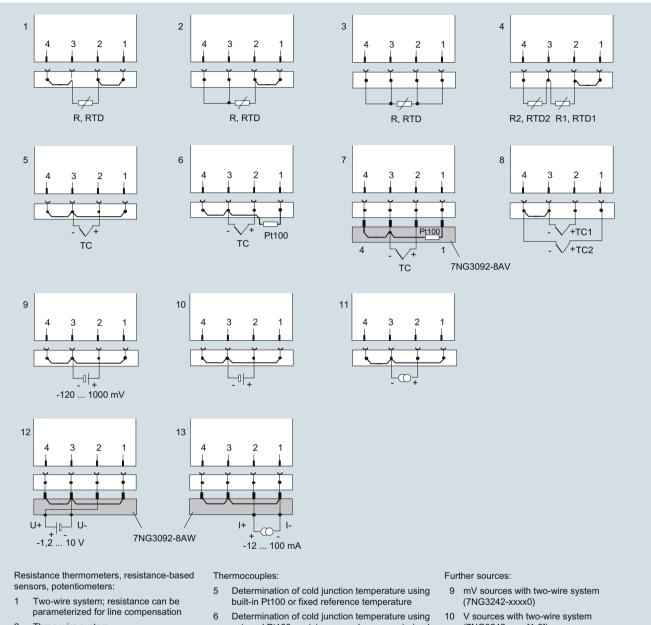
Special	operating data	
Order code	Plain text required	Options
Y00	N= \( \subseteq \). \( \subseteq \)	Factor N for multiplication with the characteristic values of resistance thermometers
		Range of values: 0.10 to 10.00
		1. Example: 3 x Pt500 parallel:
		N = 5/3 = 1.667; 2. Example: Ni120: N = 1.2
Y10	TV=000.00	Temperature TV of the fixed cold junction
	D=□	Dimension; range of values: C, K, F, R
Y11	RL=000.00	Line resistance RL in $\Omega$ for compensation of cold junction line of external Pt100 DIN IEC 751
		Range of values: 0.00 to 100.00
Y20	RL1=000.00 RL2=000.00	Line resistances RL of channel 1 (RL1) and channel 2 (RL2) in $\Omega$ if the resistance thermometer or the resistance-based sensor is connected in a two-wire system
		Range of values depending on type of sensor: 0.00 to 100.00
Y30	MA=000.00 ME=000.00	Start-of-scale value MA and full-scale value ME for thermocouples and resistance thermometers
		(Range of values depending on type of sensor)
	D=□	Dimension, range of values: C, K, F, R)
Y31	MA=000.00 ME=000.00	Start-of-scale value MA and full-scale value ME for resistance-based sensors or potentiometers in $\Omega$
		Range of values: 0.00 to 6,000.00
Y32	MA=000.00 ME=000.00	Start-of-scale value MA and full-scale value ME for mV, V, µA and mA sources
		Range of values depending on type of sensor: -120.00 to 1,000.00
	D= 🗆 🗆	Dimension (mV entered as MV, V as V, μA as UA, mA as MA)
Y50	T63=□□□.□	Response time T63 of software filter in s
		Range of values: 0.0 to 100.0
		Safety value S of signal output in mA or in V corresponding to the set type of output. Range of values - with current output: -0.50 to 23.00
		- with voltage output: -0.25 to 10.75
Y60	S=00.00	Safety value S with line breakage of sensor
Y61	S=00.00	Safety value S with line breakage or short-circuit of sensor
Y70	UG=000.00	Lower limit value (dimension as defined by measuring range)
	OG=000.00	Upper limit value (dimension as defined by measuring range)
	H=0000.00	Hysteresis (dimension as defined by measuring range)
	K=□	Switch on/off combination of limit function and sensor fault detection; J=on; N=off (standard: J)
	A= 🗆	Type of relay output: A=open-circuit operation; R=closed-circuit operation (standard: R)
	T=□□.□	Switching delay T of relay output in s Range of values: 0.0 to 10.0 (standard: 0.0)

Transmitters for rail mounting

## SITRANS TW four-wire system, universal, HART

#### Schematics

#### Sensor input connections



- 2 Three-wire system
- 3 Four-wire system
- Difference/mean-value circuit; 2 resistors can be parameterized for line compensation
- external Pt100; resistance can be parameterized for line compensation
- Determination of cold junction temperature using cold junction terminal 7NG3092-8AV
- Difference/mean-value circuit with internal cold junction temperature
- (7NG3242-xxxx[1-3])
- mA/mA sources with two-wire system (7NG3242-xxxx[4-8])
- Voltage measurement -1,2 to 10 V with U/I plug 7NG3092-8AW (7NG3242-xxxx0)
- Current measurement -12 to 100 mA with U/I plug 7NG3092-8AW (7NG3242-xxxx0)

Connection diagram for the input signal

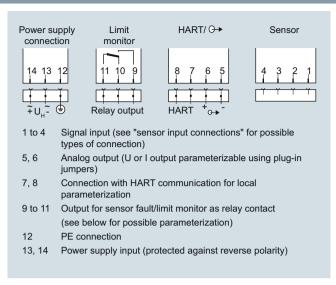
Channel 1 is the measured variable between the terminals 2 and 3 on the input plug. With a difference or mean-value circuit, the calculation of the measured value is defined by the type of measurement. Otherwise the measured value is determined via channel 1. The following code is used for the type of measurement:

type of measurement	Calculation of measured value				
Single channel	Channel 1				
Differential connection 1	Channel 1 - Channel 2				
Differential connection 2	Channel 2 - Channel 1				
Mean-value 1	½ · (Channel 1 + Channel 2)				

The short-circuit jumpers shown in the circuits must be inserted in the respective system on site.

Transmitters for rail mounting

SITRANS TW four-wire system, universal, HART

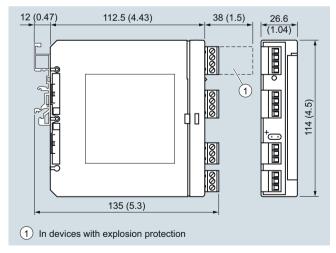


Connection diagram for power supply, input and outputs

#### Relay outputs

	Connected terminals
Closed-circuit operation (relay opens when error)	
Device switched off	10 and 11
Device switched on and no error	9 and 11
Device switched on and error	10 and 11
Open-circuit operation (relay closes when error)	
Device switched off	10 and 11
Device switched on and no error	10 and 11
Device switched on and error	9 and 11

# Dimensional drawings



Dimensions for control room mounting, rail mounting in mm (inches)

Transmitters for field mounting

#### **SITRANS TF280 WirelessHART**

#### Overview



SITRANS TF280 for flexible and cost-effective temperature measurements

- Supports the WirelessHART standard (HART V 7.1)
- · Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum representation and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) mode can be turned on and off with push of a button
- Battery power supply
- Battery life time up to 5 years
- Extend battery life time with HART modem interface which can be switch off
- Optimized power consumption through new design, and increase in battery life time
- Simple configuration thanks to SIMATIC PDM
- Housing meets IP65 degree of protection
- Supports all Pt100 sensors as per IEC 751/DIN EN 60751

#### Benefits

The SITRANS TF280 is a temperature transmitter that features WirelessHART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible temperature measurement
- Save costs on wiring at difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring costs would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes
- Easy installation also on moveable equipment parts
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and for system solutions in process automation

## Application

The SITRANS TF280 is a WirelessHART field device for temperature measurement with a Pt100 sensor.

This sensor can be installed directly on the field device, or connected at an offset with a cable connection. On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial parameterization. Alternatively the device can be commissioned comfortably by means of the local pushbuttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

#### Design

The SITRANS TF280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operation temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The antenna features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the possibility to operate directly on the device with 3 push buttons. It perfectly matches the strategy of all new Siemens field devices.

Using the device's push buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the life time of the battery.

The SITRANS TF280 transmitter features a cable gland or a Pt100 sensor including protective piping.

## Function

The SITRANS TF280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transmitted via the network to the SIEMENS IE/WSN-PA LINK.

Field device data received by the IE/WSN-PA LINK is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. For an introduction of WirelessHART, please see the FI 01 catalogue Sec. 8 or

Detailed information on IE/WSN-PA LINK can be found in the FI 01 catalogue Sec. 7 or www.siemens.com/wirelesshart.

#### Integration

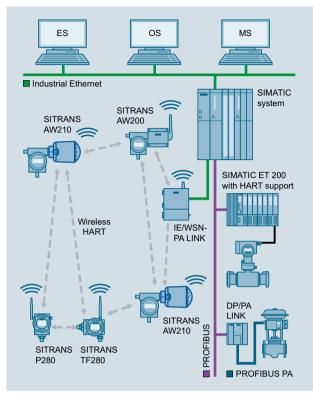
#### Connecting to SIMATIC PCS 7

The integration of field devices in SIMATIC PCS 7 and other process control systems can be now done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no wiring is available.

Where larger distances between the IE/WSN-PA LINK and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the SCALANCE W series of products. Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

Transmitters for field mounting

#### SITRANS TF280 WirelessHART



Integration of a meshed network into SIMATIC PCS 7

## Configuration

Configuration of the SITRANS TF280 transmitter may be carried out as follows:

- Initial commissioning for the SITRANS TF280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join Key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network or onsite with a HART modem or via the local user interface.

# Technical specifications

The SITRANS TF280 can be mechanically installed in two ways:

- Direct at the measuring point with a M20x1.5 thread. A connection to other threads can be done via the adapter.
- Remotely from the Pt100 sensor, which is connected to the transmitter via a cable.

The data in the following table refer to the transmitter only excluding a connected sensor, except as noted otherwise.

,	'		
Input			
Sensor			
Sensor type	Pt100 as per IEC 751/DIN EN 60751 <sup>1)</sup>		
<ul> <li>Connection</li> </ul>	Two, three or four-wire system		
Measuring range	-200 +850 °C (-328 1560 °F)		
Cable length SITRANS TF280 and Pt100 sensor element	≤ 3 m		
Measuring accuracy <sup>2)</sup>			
Accuracy	< 0.04 % of the measuring range		
Long-term drift	< 0.035 % of the measuring range in first year		
Ambient temperature effect	max. 0.1 °C/10 K		
Rated conditions			
Ambient temperature	-40 +80 °C (-40 +176 °F)		
Storage temperature	-40 +85 ° C (-40 +185 °F)		
Relative humidity	< 95%		
Climatic class	4K4H in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)		
Degree of protection	IP65/NEMA 4		
Max. permissible temperature at transmitter for directly mounted Pt100	80 °C (176 °F)		
Design			
Enclosure	Die-cast aluminum		
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95		
Resistance to vibration	DIN EN 60068-2-6/12.07		
Weight			
• without battery	1.5 kg (3.3 lb)		
• with battery	1.6 kg (3.5 lb)		
Dimensions (W x H x D)	See "Dimensional drawing"		
Thread for cable gland/ sensor connection	M20x1.5 other threads via adapter		
Material of protective tubes and process connection (only for premounted sensor pipe)	Stainless steel 1.4404 (AISI 316L, UNS S 31603, X2CrNiMo17-12-2)		
Cable between transmitter and sensor element	$\leq$ 3 m für two-, three- or four-wire connections		
	Cable resistance < 1 $\Omega$ (setting range in m $\Omega$ 09999)		
Sensor break	Recognized		

Transmitters for field mounting

# **SITRANS TF280 WirelessHART**

Displays and controls			
Display (with illumination)			
Size of display	104 x 80 pixels		
<ul> <li>Number of digits</li> </ul>	Adjustable		
<ul> <li>Number of spaces after comma</li> </ul>	Adjustable		
Setting options	on site with 3 push buttons     with SIMATIC PDM or HART Communicator		
Auxiliary power			
Battery	3.6 V DC		
Communication			
Wireless standard	WirelessHART V7.1 conforming		
Transmission frequency band	2.4 GHz (ISM-Band)		
Range under reference conditions	Up to 250 m (line of sight) in outside areas		
	Up to 50 m (greatly dependent on obstacles) in Inside areas		
Communication interfaces	HART communication with HART modem		
	WirelessHART		
Certificates and approvals			
Wireless communication approvals	R&TTE, FCC		
General Product Safety	CSA <sub>US/C</sub> , CE, UL		
Pressure equipment directive	This device is not included in the pressure device guideline; classification according to pressure device guideline (PED 97/23/EC), Directive 1/40; article 1, paragraph 2.1.4		

 $<sup>^{1)}</sup>$  Pre-mounted Pt100: Class A (maximum MES: 0.15 + 0.002\*|t| °C)

Selection and Ordering data		Article No.
SITRANS TF280 WirelessHART Temperature		7MP1110-
transmitter (Required battery not included with delivery, se accessories)	е	0 A 0 - 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	J-	
Connections/cable entry		
Cable gland M20x1.5 <sup>1)</sup> Sensor pipe with Pt100, G½" male thread, premounted and connected	<b>&gt;</b> •	C D
Display		
Digital display, visible	▶ •	1
Enclosure		
Die-cast aluminum	▶ •	1
Explosion protection		
Not included	▶ •	A
Antenna		
Variable, attached to device	▶ •	A
Further designs		Order code
Please add "-Z" to Article No. and specify Orde code(s) and plain text.	r	
Measuring point number (TAG Nr.) max. 16 digits entered in plain text Y15:		Y15
Measuring point message max. 27 characters entered in plain text: Y16:		Y16
Accessories		Article No.
Lithium battery for SITRANS TF280/P280	•	7MP1990-0AA00
Mounting bracket, steel		7MF4997-1AC
Mounting bracket, stainless steel	<b>&gt;</b>	7MF4997-1AJ
Cover, die-cast aluminum, without window	<b>&gt;</b>	7MF4997-1BB
Cover, die-cast aluminum, with window		7MF4997-1BE
Thread adapter M20x1.5 (male thread) on $\frac{1}{2}$ -14 NPT (female thread)	•	7MP1990-0BA00
Thread adapter M20x1.5 (male thread) on $G\frac{1}{2}$ (female thread)	<b>&gt;</b>	7MP1990-0BB00
IE/WSN-PA Link		see Sec. 7
HART modem with USB interface	<b></b>	7MF4997-1DB
SIMATIC PDM		see Sec. 8

- Available ex stock.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

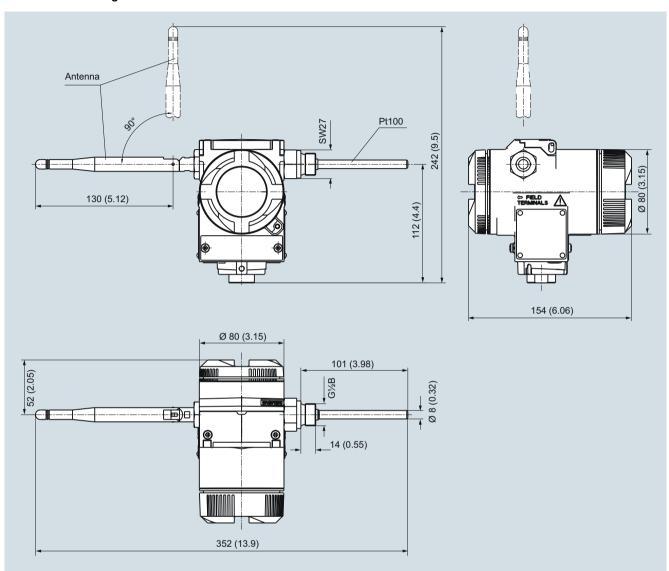
Pre-mounted Pt100: Class A (maximum MES: 0.15 ± 0.1

<sup>1)</sup> Please order sensor separately.

Transmitters for field mounting

## SITRANS TF280 WirelessHART

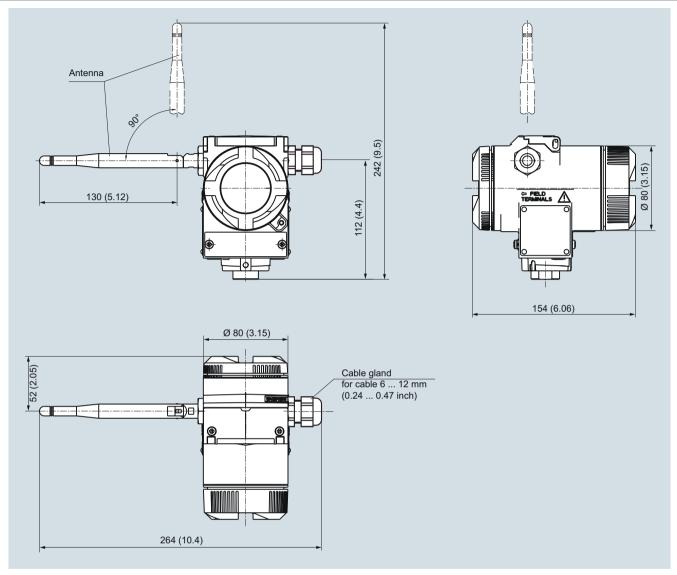
# Dimensional drawings



SITRANS TF280 WirelessHART temperature transmitter with Pt100, dimensions in mm (inch). Please see the dimensional drawing of the mounting bracket on page 1/192.

Transmitters for field mounting

## SITRANS TF280 WirelessHART



SITRANS TF280 WirelessHART temperature transmitter, dimensions in mm (inch) Please see the dimensional drawing of the mounting bracket on page 1/192.

Transmitter for field mounting/field indicator

### SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

### Overview



#### Our field devices for heavy industrial use

- HART. Universal
- 4 to 20 mA, universal
- Field indicator for 4 to 20 mA signals

The temperature transmitter SITRANS TF works where others feel uncomfortable.

#### Benefits

- Universal use
  - as transmitter for resistance thermometer, thermocouple element,  $\Omega$  or mV signal
  - as field indicator for any 4 to 20 mA signals
- Local sensing of measured values over digital display
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP66/67
- Test terminals for direct read-out of the output signal without breaking the current loop
- Can be mounted elsewhere if the measuring point
  - is hard to access,
  - is subject to high temperatures,
  - is subject to vibrations from the system,
  - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protections, for Europe and USA.
- SIL2 (with Order code C20), SIL2/3 (with C23)

### Application

SITRANS TF can be used everywhere where temperatures need to be measured under particularly adverse conditions, or where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

### Function

#### Configuration

The communication capability over the HART protocol V 5.9 of the SITRANS TF with an integrated SITRANS TH300 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

Parameterization is carried out using a PC for SITRANS TF with the integrated and programmable SITRANS TK. Available for this purpose are a special modem and the software tool SIPROM T.

#### Mode of operation

### Mode of operation of SITRANS TF as temperature transmitter

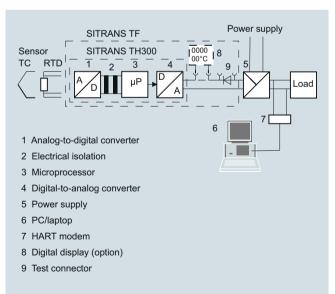
The sensor signal, whether resistance thermometer, thermocouple element or  $\Omega$  or mV signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouple elements.

The device outputs a temperature-linear direct current of 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission and configuration.

SITRANS TF automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.

#### Mode of operation of SITRANS TF as field indicator

Any 4 to 20 mA signal can be applied to the generous terminal block. As well as a range of predefined measurement units, the adjustable indicator also supports the input of customized units. This means that any 4 to 20 mA signal can be represented as any type of unit, e.g. pressure, flow rate, filling level or temperature.



Mode of operation: SITRANS TF with integrated transmitter and digital display

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

SITHANS IF - ITALISHILLEI, I	two-wire system and SITHANS	TF - Fleiu illulcator for 4 to 2	UIIIA
Technical specifications			
Input		Measuring range	parameterizable ma
Resistance thermometer			(see table "Digital m errors")
Measured variable	Temperature	Min. measured span	5 25 $\Omega$ (see Table
Sensor type			suring errors")
• to IEC 60751	Pt25 Pt1000	Characteristic curve	Resistance-linear or
• to JIS C 1604; a=0.00392 K-1	Pt25 Pt1000	Theorem	acteristic
• to IEC 60751	Ni25 Ni1000	Thermocouples  Magazined variable	Tananauatuwa
Units	°C and °F	Measured variable	Temperature
Connection		Sensor type (thermocouples)  • Type B	Pt30Rh-Pt6Rh to DIN
Normal connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system	• Type C • Type D	W5 %-Re acc. to AS
Generation of average value	Series or parallel connection of several resistance thermometers in a two-wire system for the genera- tion of average temperatures or for adaptation to other device types	<ul><li>Type E</li><li>Type J</li><li>Type K</li><li>Type L</li><li>Type N</li></ul>	NiCr-CuNi to DIN IEI Fe-CuNi to DIN IEC NiCr-Ni to DIN IEC 5 Fe-CuNi to DIN 437 NiCrSi-NiSi to DIN IE
Generation of difference	2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)	<ul><li>Type R</li><li>Type S</li><li>Type T</li></ul>	Pt13Rh-Pt to DIN IE Pt10Rh-Pt to DIN IE Cu-CuNi to DIN IEC
Interface	Davamatavinahla lina vasiatanaa	• Type U	Cu-CuNi to DIN 437
Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	Units	°C or °F
Three-wire system	No balancing required	Connection	
• Four-wire system	No balancing required	<ul> <li>Normal connection</li> </ul>	1 thermocouple (TC
Sensor current	≤ 0.45 mA	<ul> <li>Generation of average value</li> </ul>	2 thermocouples (To
Response time	≤ 250 ms for 1 sensor with open- circuit monitoring	Generation of difference	2 thermocouples (TC 1 – TC 2 or TC 2
Open-circuit monitoring	Always active (cannot be disabled)	Response time	≤ 250 ms for 1 sense circuit monitoring
Short-circuit monitoring	can be switched on/off (default value: ON)	Open-circuit monitoring  Cold junction compensation	Can be switched off
Measuring range	parameterizable (see table "Digital measuring errors")	• Internal	With integrated Pt10 thermometer
Min. measured span	10 °C (18 °F)	<ul><li>External</li></ul>	With external Pt100
Characteristic curve	Temperature-linear or special characteristic	• External fixed	(2-wire or 3-wire cor Cold junction tempe
Resistance-based sensors			set as fixed value
Measured variable	Actual resistance	Measuring range	parameterizable (se tal measuring errors
Sensor type Units	Resistance-based, potentiometers $\Omega$	Min. measured span	Min. 40 100 °C (7 (see table "Digital m
Connection		Observa stanistic sumus	errors")
Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system	Characteristic curve	Temperature-linear of characteristic
Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value	mV sensor Measured variable	DC voltage
Generation of difference	2 resistance-based sensor in 2-wire system (R 1 – R 2 or R 2 – R 1)	Sensor type	DC voltage source ( source possible ove nally connected resi
Interface	,	Units	mV
Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	Response time	≤ 250 ms for 1 sense circuit monitoring
Three-wire system	No balancing required	Open-circuit monitoring	Can be switched off
• Four-wire system	No balancing required	Measuring range	-10 +70 mV -100 +1100 mV
* *	J 1		

Sensor current

Response time

Open-circuit monitoring Short-circuit monitoring

≤ 0.45 mA

≤ 250 ms for 1 sensor with opencircuit monitoring

Can be switched off

Can be switched off (value is adjustable)

Min. measured span

Overload capability of the input

Input resistance

Characteristic curve

nax. 0 ... 2200  $\Omega$ measuring

le "Digital mea-

or special char-

IN IEC 584 ASTM 988 ASTM 988 EC 584 C 584 584 710 IEC 584 EC 584 EC 584 C 584 3710

C)

TC)

TC) 2 – TC 1)

sor with open-

00 resistance

DIEC 60751 onnection)

erature can be

see table "Digi-

72 ... 180 °F) measuring

or special

(DC voltage èr an extersistor)

sor with open-

 $2 \, \text{mV} \text{ or } 20 \, \text{mV}$ -1.5 ... +3.5 V DC

 $\geq 1 \text{ M}\Omega$ 

Voltage-linear or special charac-

Transmitter for field mounting/field indicator

# SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Output		Auxiliary power	
Output signal	4 20 mA, 2-wire	Without digital display	11 35 V DC (30 V for Ex ib;
Communication with SITRANS TH300	acc. to HART Rev. 5.9	With digital display	32 V for Ex ic and Ex nA) 13.1 5 V DC (30 V for Ex ib;
Digital display		9 , ,	32 V for Ex ic and Ex nA)
Digital display (optional)	In current loop	Electrically isolated	Between input and output
Display	Max. 5 digits	Test voltage	$U_{\rm eff} = 1 \text{ kV}, 50 \text{ Hz}, 1 \text{ min}$
Digit height	9 mm (0.35 inch)	Certificates and approvals	
Display range	-99 999 + 99 999	Explosion protection ATEX	
Units	any (max. 5 char.)	• "Intrinsic safety" type of protection	with digital display: II 2 (1) G Ex ib [ia Ga] IIC T4 Gb
Setting: Zero point, full-scale value and unit	with 3 buttons		II 2 G Ex ib IIC T4 Gb II 1D Ex ia IIIC T100 °C Da
Load voltage	2.1 V		without digital display: II 2 (1) G Ex ib [ia Ga] IIC T6 Gb
Measuring accuracy			II 2 G Ex ib IIC T6 Gb
Digital measuring errors	See table "Digital measuring errors"	- EC type test certificate	II 1D Ex ia IIIC T100 °C Da ZELM 11 ATEX 0471 X
Reference conditions		• "Operating equipment that is non-	II 3 G Ex ic IIC T6/T4 Gc
<ul> <li>Auxiliary power</li> </ul>	24 V ± 1 %	ignitable and has limited energy for zone 2" type of protection	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA [ic] IIC T6/T4 Gc
• Load	500 Ω	- EC type test certificate	ZELM 11 ATEX 0471 X
Ambient temperature	23 °C (73.4 °F)	"Flame-proof enclosure" type of	II 2 G Ex d IIC T6/T5 Gb
Warming-up time	> 5 min	protection	II 2 D Ex tb IIIC T100 °C Db
Error in the analog output (digi- tal/analog converter)	< 0.025 % of span	- EC type test certificate	ZELM 11 ATEX 0472 X
Error due to internal cold junction	< 0.5 °C (0.9 °F)	Explosion protection to FM	Certificate of Compliance 3017742
Influence of ambient temperature		<ul> <li>Identification (XP, DIP, NI, S)</li> </ul>	• XP/I/1/BCD/T5 Ta = 85 °C
<ul> <li>Analog measuring error</li> </ul>	0.02 % of span/10 °C (18 °F)		(185  °F), T6 Ta = 60 °C $(140  °F)$ , Type 4X
<ul> <li>Digital measuring errors</li> </ul>			• DIP/II, III/1/EFG/T5 Ta = 85 °C
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)		(185 °F), T6 Ta = 60 °C (140 °F), Type 4X
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)		• NI/I/2/ABCD/T5 Ta = 85 °C
Auxiliary power effect	< 0.001 % of span/V		$(185  ^{\circ}\text{F})$ , T6 Ta = 60 $^{\circ}\text{C}$ $(140  ^{\circ}\text{F})$ ,
Effect of load impedance	< 0.002 % of span/100 $\Omega$		Type 4X
Long-term drift			• S/II, III/2/FG/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F),
In the first month	< 0.02 % of span		Type 4X
After one year	< 0.3 % of span	Other certificates	IECEx, EAC Ex(GOST), INMETRO, NEPSI, KOSHA
After 5 years	< 0.4 % of span	Hardware and software require-	IIVIVIETAO, INEFSI, KOSHA
Conditions of use		ments	
Ambient conditions		• For the parameterization software	
Storage temperature	-40 +85 °C (-40 +185 °F)	SIPROM T for SITRANS TF with TH200	
Condensation	Permissible	- Personal computer	PC with CD-ROM drive and USB
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21	- PC operating system	Windows 98, NT, 2000, XP, 7 and Win 8
Degree of protection to EN 60529	IP66/67	For the parameterization software	See chapter 8 "Software",
Construction		SIMATIC PDM for SITRANS TH300	"SIMATIC PDM"
Weight	Approx. 1.5 kg (3.3 lb) without options	Communication	
Dimensions	See "Dimensional drawings"	Load for HART connection	230 1100 Ω
Enclosure material	Die-cast aluminum, low in copper,	Two-core shielded	≤ 3.0 km (1.86 mi)
	GD-AlSi 12 or stainless steel, polyester-based lacquer, stain- less steel rating plate	Multi-core shielded  Protocol	≤ 1.5 km (0.93 mi) HART protocol, version 5.9
Electrical connection, sensor con-	Screw terminals, cable inlet via	Factory setting (transmitter):	
nection	M20 x 1.5 or ½-14 NPT screwed	<ul> <li>Pt100 (IEC 751) with 3-wire cir</li> </ul>	
Mounting bracket (optional)	gland Steel galvanized and chrome-	<ul> <li>Measuring range: 0 100 °C</li> </ul>	
Modifility pracket (Optional)	Steel, galvanized and chrome- plated or stainless steel	<ul> <li>Error signal in the event of ser</li> </ul>	nsor breakage: 22.8 mA
		<ul> <li>Sensor offset: 0 °C (0 °F)</li> </ul>	

• Sensor offset: 0 °C (0 °F)

• Damping 0.0 s

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

#### Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. n sured		Digita accura	
	°C / (°F)	°C)	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

## Resistance-based sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

### Thermocouples

Measuring range				
°C / (°F)	°C	(°F)	°C	(°F)
100 1820 (212 3308)	100	(180)	2 <sup>1)</sup>	(3.6) <sup>1)</sup>
0 2300 (32 4172)	100	(180)	2	(3.6)
0 2300 (32 4172)	100	(180)	1 <sup>2)</sup>	$(1.8)^{2}$
-200 +1000 (-328 +1832)	50	(90)	1	(1.8)
-210 +1200 (-346 +2192)	50	(90)	1	(1.8)
-200 +1370 (-328 +2498)	50	(90)	1	(1.8)
-200 +900 (-328 +1652)	50	(90)	1	(1.8)
-200 +1300 (-328 +2372)	50	(90)	1	(1.8)
-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
-50 +1760 (-58 +3200)	100	(180)	2	(3.6)
-20 +400 (-328 +752)	40	(72)	1	(1.8)
-200 +600 (-328 +1112)	50	(90)	2	(3.6)
	°C / (°F)  100 1820 (212 3308) 0 2300 (32 4172) 0 2300 (32 4172) -200 +1000 (-328 +1832) -210 +1200 (-346 +2192) -200 +1370 (-328 +2498) -200 +900 (-328 +1652) -200 +1760 (-328 +2372) -50 +1760 (-58 +3200) -50 +1760 (-58 +3200) -20 +400 (-328 +752) -200 +600	°C / (°F)         °C           100 1820 (212 3308)         100 (212 3308)           0 2300 (32 4172)         100 (32 4172)           0 2300 (32 4172)         50 (-328 +1832)           -200 +1000 (-328 +1832)         50 (-346 +2192)           -200 +1370 (-328 +2498)         50 (-328 +2498)           -200 +900 (-328 +1652)         50 (-328 +2372)           -50 +1760 (-58 +3200)         100 (-58 +3200)           -50 +1760 (-58 +3200)         100 (-328 +752)           -200 +400 (-328 +752)         -200 +600           50         50	**Sured **pan           **C / (*F)         **C         (*F)           100 1820 (212 3308)         100         (180)           0 2300 (32 4172)         100         (180)           0 2300 (32 4172)         100         (180)           -200 +1000 (-328 +1832)         50         (90)           -210 +1200 (-346 +2192)         50         (90)           -200 +1370 (-328 +2498)         50         (90)           -200 +900 (-328 +1652)         50         (90)           -200 +1760 (-58 +3200)         50         (90)           -50 +1760 (-58 +3200)         100         (180)           -50 +1760 (-58 +3200)         100         (180)           -20 +400 (-328 +752)         40         (72)           -200 +600         50         (90)	**Sured span         accurate           **C / (*F)         **C         (*F)         **C           100 1820 (212 3308)         100 (180)         21)           0 2300 (32 4172)         100 (180)         2           0 2300 (32 4172)         100 (180)         12)           -200 +1000 (-328 +1832)         50 (90)         1           -210 +1200 (-346 +2192)         50 (90)         1           -200 +1370 (-328 +2498)         50 (90)         1           -200 +1370 (-328 +2498)         50 (90)         1           -200 +900 (-328 +1652)         50 (90)         1           -50 +1760 (-58 +3200)         100 (180)         2           -50 +1760 (-58 +3200)         100 (180)         2           -20 +400 (-328 +752)         40 (72)         1           -200 +600         50 (90)         2

 $<sup>^{1)}</sup>$  The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

### mV sensor

Input	Measuring span	Min. mea- sured span	Digital accuracy
	mV	mV	μV
mV sensor	-10 +70	2	40
mV sensor	-100 +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

 $<sup>^{2)}</sup>$  The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Temperature transmitter in field housing two-wire system 4 20 mA, with electrical isolation, with documentation on MinIDVD 2 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Integrated transmitter SITRANS TH200, programmable  • With Ex in the PIA Life Cycle Portal.  Integrated transmitter SITRANS TH200, programmable  • With Ex in the PIA Life Cycle Portal.  Integrated transmitter SITRANS TH200, programmable  • With Ex in the PIA Life Cycle Portal.  Integrated transmitter SITRANS TH200, programmable  • With Ex in the Vith Ex in the	SITRANS IF		,
Two-wire system 4 20 mA, with electrical isolation, with documentation on MinIDVD  2 Click on the Article No, for the online configuration in the PIA Life Cycle Portal.  Integrated transmitter  SITRANS TH200, programmable  • Without Ex protection  • With Ex ia  • With Ex naL for zone 2  • Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup> SITRANS TH300, communication capability according to HART V 5.9  • Without Ex-protection  • With Ex naL for zone 2  • Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup> SITRANS TH300, communication capability according to HART V 5.9  • Without Ex-protection  • With Ex naL for zone 2  • Total device SITRANS TF Ex d <sup>1)</sup> • Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup> * Finclosure  Die-cast aluminium  Stainless steel precision casting  * Connections/cable inlet  Screwed glands M20x1.5  Screwed glands M20x1.5  Screwed glands M20x1.5  Screwed glands W2-14 NPT  Digital indicator  Without  Made of steel  Made of stainless steel  **Further designs**  Please add *-Z** to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points)  Functional safety SIL2/3  Explosion protection Ex d to INMETRO  (Brazil) (only with TNG3131)  • Explosion protection Ex d to INMETRO  (Brazil) (only with TNG3134)  • Explosion protection Ex nA to INMETRO  (Brazil) (only with TNG3134)  • Explosion protection Ex nA to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  •	Selection and Ordering data	Article No.	
guration in the PIA Life Cycle Portal.  Integrated transmitter STIRANS TH200, programmable  • Without Ex protection  • With Ex ia  • With Ex ia  • With Ex nAL for zone 2  • Total device SITRANS TF Ex d¹¹  • Total device SITRANS TF Ex coording to FM (XP, DIP, NI, S)¹¹  SITRANS TH300, communication capability according to HART V 5.9  • Without Ex-protection  • With Ex ia  • With Ex nAL for zone 2  • Total device SITRANS TF Ex d¹¹  • With Ex nAL for zone 2  • Total device SITRANS TF Ex d¹¹  • With Ex nAL for zone 2  • Total device SITRANS TF Ex d¹¹  • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹¹  Enclosure  Die-cast aluminium  Stainless steel precision casting  Connections/cable inlet  Screwed glands M20x1.5  C Digital indicator  Without  Mounting bracket and securing parts  Without  Made of steel  Made of stainless steel  Further designs  Please add *-Z* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points)  Functional safety SIL2  Explosion protection  • Explosion protection Ex a to INMETRO  (Brazil) (only with TNG3134)  • Explosion protection Ex a to INMETRO  (Brazil) (only with TNG3134)  • Explosion protection Ex a to INMETRO  (Brazil) (only with TNG3134)  • Explosion protection Ex a to INMETRO  (Brazil) (only with TNG3132)  • Explosion protection Ex a to NEPSI  (China) (only with TNG3132)  • Explosion protection Ex a to NEPSI  (China) (only with TNG3132)  • Explosion protection Ex a to NEPSI  (China) (only with TNG3132)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex desir	Two-wire system 4 20 mA, with electrical	7 N G 3 1 3	
SITFANS TH200, programmable  • Without Ex protection  • With Ex ia  • With Ex naL for zone 2  • Total device SITRANS TF Ex d¹)  • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  SITRANS TH300, communication capability according to HART V 5.9  • Without Ex-protection  • With Ex ia  • With Ex naL for zone 2  • Total device SITRANS TF Ex d¹)  • Without Ex-protection  • With Ex ia  • With Ex naL for zone 2  • Total device SITRANS TF Ex d¹)  • Total device SITRANS TF Ex d¹)  • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  Enclosure  Die-cast aluminium  Stainless steel precision casting  Connections/cable inlet  Screwed glands ½-14 NPT  Digital indicator  Without  Mounting bracket and securing parts  Without  Made of stainless steel  Further designs  Please add *2* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points)  Functional safety SIL2/3  Explosion protection Ex ia to INMETRO  (Brazil) (only with TNG3131)  • Explosion protection Ex d to INMETRO  (Brazil) (only with TNG3132)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NEPSI  (China) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea) (only with TNG3134)  • Explosion protection Ex d to NCSHA  (Korea)			
With Ex in a service of the ser			
With Ex naL for zone 2     Vital device SITRANS TF Ex d <sup>1)</sup> Total device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> SITRANS TH300, communication capability according to HART V 5.9     Without Ex-protection     With Ex naL for zone 2     Vital device SITRANS TF Ex d <sup>1)</sup> Vital device SITRANS TF Ex d <sup>1)</sup> Vital ex-protection     With Ex naL for zone 2     Vital device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1)</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, S) <sup>1</sup> Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final device SITRANS TF according to FM     (XP, DIP, NI, SI)      Final		5	0
With Ex nAL for zone 2     Total device SITRANS TF Ex d¹)     Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  SITRANS TH300, communication capability according to HART V 5.9     Without Ex-protection     With Ex ia     With Ex nAL for zone 2     Total device SITRANS TF Ex d¹)     Total device SITRANS TF Ex d¹)     Total device SITRANS TF Ex d¹)     Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  Enclosure  Die-cast aluminium  Stainless steel precision casting  Connections/cable inlet  Screwed glands M20x1.5  Screwed glands ½-14 NPT  Digital indicator  Without  Made of steel  Made of stael  Made of stainless steel  Further designs  Please add *.72* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points)  Functional safety SiL.2  Functional safety SiL.2  Explosion protection Ex ia to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex a to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to INMETRO  (Brazil) (only with 7NG3131)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3131)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3132)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Explosion protection Ex A to NEPSI  (China) (only with 7NG3134)  Ex	·		
• Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup> SITRANS TH300, communication capability according to HART V 5.9      • Without Ex-protection     • With Ex ia     • With Ex ia     • With Ex nAL for zone 2     • Total device SITRANS TF Ex d <sup>1)</sup> • Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup> Finclosure     Die-cast aluminium     Stainless steel precision casting     Connections/cable inlet     Screwed glands W20x1.5     Screwed gland W20x1.5     Screwed g			
(XP, DIP, NI, S) <sup>1</sup> ) SITRANS TH300, communication capability according to HART V 5.9  • Without Ex-protection • With Ex ia • With Ex nAL for zone 2 • Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1</sup> )  Enclosure Die-cast aluminium Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without With  Mounting bracket and securing parts Without Made of stainless steel Made of stainless steel  Further designs Please add *-Z* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL.2 Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131) • Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3134) • Explosion protection Ex i to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to INMETRO (Brazil) (only with 7NG3134) • Explosion protection Ex to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex a to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion protection Ex d to NGSHA (Korea) (only with 7NG3134) • Explosion prot			-
SITRANS TH300, communication capability according to HART V 5.9  Without Ex-protection  With Ex ia  With Ex naL for zone 2  Total device SITRANS TF Ex d¹¹  Total device SITRANS TF according to FM (XP, DIP, NI, S)¹¹  Enclosure  Die-cast aluminium  Stainless steel precision casting  Connections/cable inlet  Screwed glands M20x1.5  Screwed glands ½-14 NPT  Digital indicator  Without  Mounting bracket and securing parts  Without  Made of steel  Made of stainless steel  Made of stainless steel  Please add ".Z' to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points)  Functional safety SIL.2  Functional safety SIL.2  Functional safety SIL.2  Functional safety SIL.2  Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  Explosion protection Ex at to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex in to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7RG3136)  Explosion protectio	Total device SITRANS TF according to FM     (XP DIP NI S)1)	5	5
Without Ex-protection     With Ex ia     With Ex nAL for zone 2     Total device SITRANS TF Ex d¹)     Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)     Enclosure     Die-cast aluminium     Stainless steel precision casting     Connections/cable inlet     Screwed glands M20x1.5     Screwed glands ½-14 NPT     Digital indicator     Without     Without     Made of steel     Made of stainless steel     Further designs     Please add '-Z' to Article No. and specify     Order code(s) and plain text.     Test protocol (5 measuring points)     Functional safety SiL2/3     Explosion protection     Explosion protection Ex ia to INMETRO     (Brazil) (only with 7NG3131)     Explosion protection Ex nA to INMETRO     (Brazil) (only with 7NG3134)     Explosion protection Ex nA to INMETRO     (Brazil) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex d to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (only with 7NG3134)     Explosion protection Ex nA to NEPSI     (China) (			
• With Ex nAL for zone 2 • Total device SITRANS TF Ex d¹) • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  Enclosure Die-cast aluminium Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands №-14 NPT  Digital indicator Without With Mounting bracket and securing parts Without Made of steel Made of stainless steel  Further designs Please add *-Z* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL.2/3 Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131) • Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3134) • Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132) • Explosion protection Ex nA to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protecti	according to HART V 5.9		
• With Ex nAL for zone 2 • Total device SITRANS TF Ex d¹) • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹)  Enclosure  Die-cast aluminium Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without With  Mounting bracket and securing parts Without With  Mounting bracket and securing parts Without Made of steel Screwed glands Yall Made of steel  Defercode  Order code  Catle  E25  C23  Explosion protection Ex i to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex in NePSI (China) (only with 7NG3134)  Explosion protection Ex in NePSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex do NOSHA (Korea) (only with 7NG3134)  Transient protection  Transient	•		
• Total device SITRANS TF Ex d¹¹) • Total device SITRANS TF according to FM (XP, DIP, NI, S)¹¹)  Enclosure  Die-cast aluminium Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without  Mounting bracket and securing parts Without Made of steel Made of steel Made of steinless steel  Further designs Please add *-Z* to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL2/3 Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131) • Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3132) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to NEPSI (China) (only with 7NG3134) • Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134) • Transient protection • Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810534) included • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) includ			
Total device SITRANS TF according to FM (XP, DIP, NI, S) 1)  Enclosure  Die-cast aluminium  Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator  Without  Mounting bracket and securing parts Without  Made of steel Made of stainless steel  Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL2/3 Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex A to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex to to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to NEP			
Enclosure Die-cast aluminium Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without With Mounting bracket and securing parts Without Made of steel Made of stainless steel  Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL.2 Functional safety SIL.2/3 Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Two coats of lacquer on casing and cover (PU on epoxy)  Transient protection Cable gland 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810534) included  Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848694 and 810634) included	<ul> <li>Total device SITRANS TF according to FM</li> </ul>	6	5
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Stainless steel precision casting  Connections/cable inlet Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without With  Mounting bracket and securing parts Without Made of steel Made of stainless steel  Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL2 Functional safety SIL2/3 Explosion protection • Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131) • Explosion protection Ex at to INMETRO (Brazil) (only with 7NG3132) • Explosion protection Ex i to NEPSI (China) (only with 7NG3131) • Explosion protection Ex i to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3132) • Explosion protection Ex A to NEPSI (China) (only with 7NG3132) • Explosion protection Ex A to NEPSI (China) (only with 7NG3132) • Explosion protection Ex A to NEPSI (China) (only with 7NG3132) • Explosion protection Ex A to NEPSI (China) (only with 7NG3132) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion protection Ex A to NEPSI (China) (only with 7NG3134) • Explosion			
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Screwed glands M20x1.5 Screwed glands M20x1.5 Screwed glands ½-14 NPT  Digital indicator Without With Mounting bracket and securing parts Without Made of steel Made of steel Made of stainless steel  Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.  Test protocol (5 measuring points) Functional safety SIL2 Functional safety SIL2/3 Explosion protection Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131) Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3132) Explosion protection Ex it to NEPSI (China) (only with 7NG3131) Explosion protection Ex d to NEPSI (China) (only with 7NG3134) Explosion protection Ex nA to NEPSI (China) (only with 7NG3134) Explosion protection Ex nA to NEPSI (China) (only with 7NG3134) Explosion protection Ex nA to NEPSI (China) (only with 7NG3134) Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (o	<u></u>	-	
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Test protocol (5 measuring points)  Functional safety SIL2 Functional safety SIL2/3  Explosion protection  • Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  • Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)  • Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  • Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  • Explosion protection Ex i to NEPSI (China) (only with 7NG3131)  • Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  • Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  • Explosion protection Ex d to NEPSI (China) (only with 7NG3132)  • Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  • Two coats of lacquer on casing and cover (PU on epoxy)  • Transient protection  • Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included  • Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  • Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and	Please add "-Z" to Article No. and specify		
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Explosion protection  Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex i to NEPSI (China) (only with 7NG3131)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Two coats of lacquer on casing and cover (PU on epoxy)  Transient protection  Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and			
Explosion protection  • Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)  • Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)  • Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  • Explosion protection Ex i to NEPSI (China) (only with 7NG3131)  • Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  • Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  • Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  • Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  • Two coats of lacquer on casing and cover (PU on epoxy)  • Transient protection  • Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included  • Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  • Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  • Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and			
<ul> <li>Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)</li> <li>Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)</li> <li>Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)</li> <li>Explosion protection Ex is to NEPSI (China) (only with 7NG3131)</li> <li>Explosion protection Ex d to NEPSI (China) (only with 7NG3134)</li> <li>Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)</li> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3132)</li> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	, .	G23	
(Brazil) (only with 7NG3131)  Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex it to NEPSI (China) (only with 7NG3131)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3132)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Two coats of lacquer on casing and cover (PU on epoxy)  Transient protection  Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and	·	F25	
(Brazil) (only with 7NG3134)  Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)  Explosion protection Ex i to NEPSI (China) (only with 7NG3131)  Explosion protection Ex d to NEPSI (China) (only with 7NG3134)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)  Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)  Two coats of lacquer on casing and cover (PU on epoxy)  Transient protection  Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included  Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included  Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and	(Brazil) (only with 7NG3131)		
<ul> <li>Explosion protection Ex i to NEPSI (China) (only with 7NG3131)</li> <li>Explosion protection Ex d to NEPSI (China) (only with 7NG3134)</li> <li>Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)</li> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	(Brazil) (only with 7NG3134)		
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<ul> <li>Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)</li> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	Explosion protection Ex d to NEPSI	E56	
<ul> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	<ul> <li>Explosion protection Ex nA to NEPSI</li> </ul>	E57	
<ul> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	<ul> <li>Explosion protection Ex d to KOSHA</li> </ul>	E70	
<ul> <li>Transient protection</li> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	Two coats of lacquer on casing and cover	G10	
<ul> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>		J01	
<ul> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	<ul> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and</li> </ul>		
<ul> <li>Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included</li> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and</li> </ul>	<ul> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and</li> </ul>	D58	
Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and	Cable gland 1/2 NPT ADE 4F, stainless steel	D59	
cable diam. 4 8.5 (CAPRI 818674 and		D60	
	cable diam. 4 8.5 (CAPRI 818674 and	500	

Selection and Ordering data	Order code
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>2)</sup>
Measuring point no. (TAG), max. 8 characters	Y17 <sup>3)</sup>
Meas. point descriptor, max. 16 characters	Y23 <sup>4)</sup>
Meas. point message, max. 32 characters	Y24 <sup>4)</sup>
Only inscription on measuring point label: specify in plain text: Measuring range	Y22 <sup>4)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>5)</sup>
Pt100 (IEC) 3-wire	U03 <sup>5)</sup>
Pt100 (IEC) 4-wire	U04 <sup>5)</sup>
Thermocouple type B	U20 <sup>5)6)</sup>
Thermocouple type C (W5)	U21 <sup>5)6)</sup>
Thermocouple type D (W3)	U22 <sup>5)6)</sup>
Thermocouple type E	U23 <sup>5)6)</sup>
Thermocouple type J	U24 <sup>5)6)</sup>
Thermocouple type K	U25 <sup>5)6)</sup>
Thermocouple type L	U26 <sup>5)6)</sup>
Thermocouple type N	U27 <sup>5)6)</sup>
Thermocouple type R	U28 <sup>5)6)</sup>
Thermocouple type S	U29 <sup>5)6)</sup>
Thermocouple type T	U30 <sup>5)6)</sup>
Thermocouple type U	U31 <sup>5)6)</sup>
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>7)</sup>
Fail-safe value 3.6 mA (instead of 22.8 mA)	U36 <sup>3)</sup>
Supply units see Chapter "Supplementary Compone	ents".

Supply units see Chapter "Supplementary Components".

- 1) Without cable gland.
- 2) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- <sup>3)</sup> For this selection, Y01 or Y09 must also be selected.
- 4) If only Y22, Y23 or Y24 are ordered and the label <u>only</u> has to be on the tag plate, Y01 does not have to be specified.
- 5) For this selection, Y01 must also be selected.
- 6) Internal cold junction compensation is selected as the default for TC.
- 7) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.
Accessories	
Modem for SITRANS TH100, TH200, TR200 ▶ and TF with TH200 incl. parameterization software T	7NG3092-8KU
with USB interface	
MiniDVD for temperature measuring instruments	A5E00364512
with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)	
HART modem With USB interface	7MF4997-1DB
SIMATIC PDM parameterization software also for SITRANS TH300	see chapter 8
Mounting bracket and securing parts	
Made of steel for 7NG313B	7MF4997-1AC
Made of steel for 7NG313C	7MF4997-1AB
Made of stainless steel for 7NG313B	7MF4997-1AJ
Made of stainless steel for 7NG313C	7MF4997-1AH
Digital indicator <sup>1)</sup>	7MF4997-1BS
Connection board	A5E02226423

Available ex stock.

Supply units see Chapter "Supplementary Components".

### Ordering example 1:

7NG3135-0AB11-Z Y01+Y23+U03 Y01: -10 ... +100 °C Y23: TICA1234HEAT

Ordering example 2:

7NG3136-0AC11-Z Y01+Y23+Y24+U25 Y01: -10 ... +100 °C Y23: TICA 1234 ABC

Y24: HEATING BOILER 56789

## Factory setting (transmitter):

- Pt100 (IEC 751) with three-wire circuit
  Measuring range: 0 ... 100 °C (32 ... 212 °F)
  Fault current 22.8 mA
  Sensor offset: 0 °C (0 °F)
  Damping 0.0 s

 $<sup>^{1)}\,</sup>$  It is not possible to upgrade devices with Ex protection

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.
SITRANS TF field indicator	7 N G 3 1 3 0 -
for 4 20 mA signals, with documentation on MiniDVD	
➢ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Without Ex-protection	0 1
With Ex ia With Ex nAL for zone 2	1 1 2 1
Total device SITRANS TF Ex d <sup>1)</sup>	4 1
Total device SITRANS TF according to FM (XP, DIP, NI, S) <sup>1)</sup>	5 1
Enclosure	
Die-cast aluminium Stainless steel precision casting	A E
Connections/cable inlet	
Screwed glands M20x1.5	В
Screwed glands ½-14 NPT	С
<b>Digital indicator</b> With	1
Mounting bracket and securing parts	
Without Made of steel	0
Made of stainless steel	2
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Test protocol (5 measuring points)	C11
Explosion protection	
<ul> <li>Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)</li> </ul>	E25
<ul> <li>Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)</li> </ul>	E26
<ul> <li>Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)</li> </ul>	E27
<ul> <li>Explosion protection Ex i to NEPSI (China) (only with 7NG3131)</li> </ul>	E55
<ul> <li>Explosion protection Ex d to NEPSI (China) (only with 7NG3134)</li> </ul>	E56
<ul> <li>Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)</li> </ul>	E57
<ul> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> </ul>	E70
<ul> <li>Two coats of lacquer on casing and cover (PU on epoxy)</li> </ul>	G10
Transient protection	J01
<ul> <li>Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included</li> </ul>	D57
<ul> <li>Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included</li> </ul>	D58
Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	D59
Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and 810534) included	D60

Selection and Ordering data	Order code
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>2)</sup>
Only inscription on TAG plate: specify in plain text: Measuring range	Y22 <sup>3)</sup>
Only inscription on TAG plate: Measuring point descriptor, max. 16 characters	Y23 <sup>3)</sup>
Only inscription on TAG plate: Measuring point message, max. 27 characters	Y24 <sup>3)</sup>
Special differing customer-specific programming, specify in plain text	Y09 <sup>4)</sup>

Supply units see Chapter "Supplementary Components".

- 1) Without cable gland.
- 2) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- <sup>3)</sup> If only Y22, Y23 or Y24 are ordered and the label <u>only</u> has to be on the tag plate, Y01 does not have to be specified.
- 4) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and Ordering data	Article No.
Accessories	
MiniDVD for temperature measuring instruments	A5E00364512
with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)	
Mounting bracket and securing parts	-
Made of steel for 7NG313B	7MF4997-1AC
Made of steel for 7NG313C	7MF4997-1AB
Made of stainless steel for 7NG313B	7MF4997-1AJ
Made of stainless steel for 7NG313C	7MF4997-1AH
Digital indicator <sup>1)</sup>	7MF4997-1BS
Connection board	A5E02226423

- Available ex stock.
- 1) It is not possible to upgrade devices with Ex protection

### Ordering example 1:

7NG3130-0AB10-Z Y01+Y23

Y01: -5...100 °C Y23: TICA1234HEAT

#### Ordering example 2:

7NG3130-0AC10-Z Y01+Y23+Y24

Y01: 0 ... 20 BAR Y23: PICA 1234 ABC

Y29: HEATING BOILER 67890

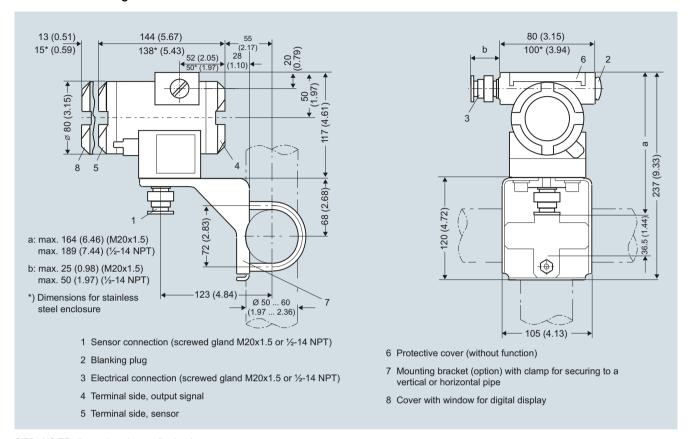
#### Factory setting (field indicator):

4 ... 20 mA

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

### Dimensional drawings

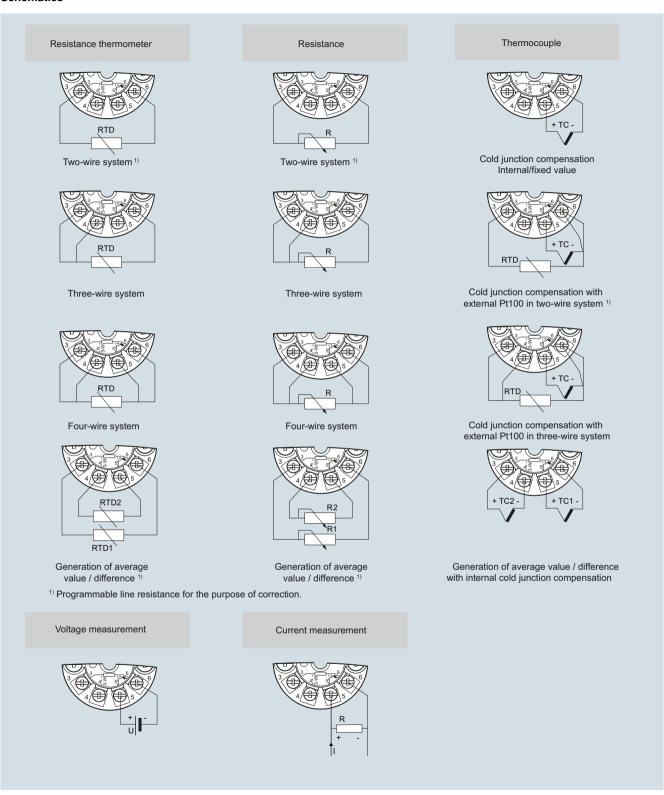


SITRANS TF, dimensions in mm (inches)

Transmitter for field mounting/field indicator

## SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

## Schematics



SITRANS TF, sensor connection assignment

Transmitters for field mounting

#### SITRANS TF fieldbus transmitter

#### Overview



#### Our field devices for heavy industrial use

- FOUNDATION fieldbus
- PROFIBUS PA

The SITRANS TF temperature transmitter works where others can't cope.

### Benefits

- ullet For universal use as a transmitter for resistance thermometers, thermocouple elements,  $\Omega$  or mV signals
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP66/67
- · Can be mounted elsewhere if the measuring point
  - is hard to access,
  - is subject to high temperatures,
  - is subject to vibrations from the system,
  - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protection, for Europe and USA

### Application

The SITRANS TF can be used everywhere where temperatures need to be measured under particularly harsh conditions. Which is why users from all industries have opted for this field device.

The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements.

The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

#### Function

#### Features

- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- · Electrically isolated
- · Version for use in hazardous areas
- Special characteristic
- Sensor redundance

Transmitter with PROFIBUS PA communication

• Function blocks: 2 x analog

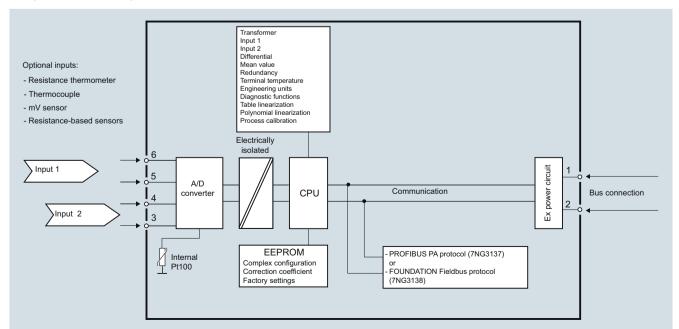
Transmitter with FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

#### Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TF (7NG3137-... and 7NG3138-...) is the type of field bus protocol used (PROFIBUS PA or FOUNDATION fieldbus).

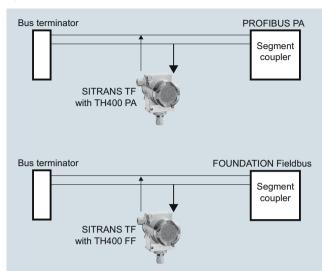


SITRANS TF with TH400, function diagram

Transmitters for field mounting

## SITRANS TF fieldbus transmitter

## System communication



SITRANS TF with TH400, communication interface

## Technical specifications

Input	
Analog/digital conversion	
<ul> <li>Measurement rate</li> </ul>	< 50 ms
<ul> <li>Resolution</li> </ul>	24-bit
Resistance thermometer	
Pt25 1000 to IEC 60751/JIS C 1604	
Measuring range	-200 +850 °C (-328 +1562 °F)
Ni25 1000 to DIN 43760	
<ul> <li>Measuring range</li> </ul>	-60 +250 °C (-76 +482 °F)
Cu10 1000, $\alpha = 0.00427$	
<ul> <li>Measuring range</li> </ul>	-50 +200 °C (-58 +392 °F)
Line resistance per sensor cable	Max. 50 $\Omega$
Sensor current	Nominal 0.2 mA
Sensor fault detection	
<ul> <li>Sensor break detection</li> </ul>	Yes
<ul> <li>Sensor short-circuit detection</li> </ul>	Yes, $< 15 \Omega$
Resistance-based sensors	
Measuring range	0 10 kΩ
Line resistance per sensor cable	Max. 50 $\Omega$
Sensor current	Nominal 0.2 mA
Sensor fault detection	
<ul> <li>Sensor break detection</li> </ul>	Yes
<ul> <li>Sensor short-circuit detection</li> </ul>	Yes, $<$ 15 $\Omega$

Thermocouple			
to IEC 584	Measuring range	)	
• Type B	400 1820 °C (752 3308 °F)		
• Type E	-100 +1000 °C (-148 +1832 °I		
• Type J	-100 +1000 °C (-148 +1832 °F)		
• Type K	-100 +1200 °C (-148 +2192 °F)		
• Type N	-180 +1300 °C (-292 +2372 °I		
• Type R		(-58 +3200 °F)	
• Type S		(-58 +3200 °F)	
• Type T	-200 +400 °C	(-328 +752 °F)	
to DIN 43710			
• Type L	-200 +900 °C (	-328 +1652 °F)	
• Type U	-200 +600 °C (	-328 +1112 °F)	
to ASTM E988-90			
• Type W3	0 2300 °C (32	4172 °F)	
• Type W5	0 2300 °C (32		
External cold junction compensation	-40 +135 °C (-	40 +275 °F)	
Sensor fault detection			
<ul> <li>Sensor break detection</li> </ul>	Yes		
• Sensor short-circuit detection	Yes, < 3 mV		
Sensor current in the event of open-circuit monitoring	4 μΑ		
mV sensor - voltage input			
Measuring range	-800 +800 mV		
Input resistance	10 ΜΩ		
Output			
Filter time (programmable)	0 60 s		
Update time	< 400 ms		
Measuring accuracy			
Accuracy is defined as the higher value of general values and basic values.			
General values			
Type of input	Absolute accuracy	Temperature coefficient	
All	≤±0.05 % of the measured value	≤±0.002 % of the measured value/°C	
Basic values			
Type of input	Basic accuracy	Temperature coefficient	
Pt100 and Pt1000	≤ ± 0.1 °C	≤ ± 0.002 °C/°C	
Ni100	≤ ± 0.15 °C	≤ ± 0.002 °C/°C	
Cu10	≤ ± 1.3 °C	≤ ± 0.02 °C/°C	
Resistance-based sensors	$\leq$ ± 0.05 $\Omega$	≤± 0.002 Ω/°C	
Voltage source	$\leq$ $\pm$ 10 $\mu$ V	≤ ± 0.2 μV/°C	
Thermocouple, type: E, J, K, L, N, T, U	≤ ± 0.5 °C	≤ ± 0.01 °C/°C	
Thermocouple, type: B, R, S, W3, W5	≤±1°C	≤ ± 0.025 °C/°C	
Cold junction compensation	≤ ± 0.5 °C		
Reference conditions			
Warming-up time	30 s		
Signal-to-noise ratio	Min. 60 dB		
Calibration condition	20 28 °C (68	. 82 °F)	
	== 0 (00	,	

Transmitters for field mounting

# SITRANS TF fieldbus transmitter

Conditions of use		Certificates and approvals		
Ambient conditions		Explosion protection ATEX		
Permissible ambient temperature	-40 +85 °C (-40 +185 °F)	EC type test certificate	ZELM 11 ATEX 0471 X	
Permissible storage temperature Relative humidity	-40 +85 °C (-40 +185 °F) ≤ 98 %, with condensation	<ul> <li>Type of protection "intrinsic safety i" (version: 7NG313x-1xxxx)</li> </ul>	II 2 (1) G Ex ib [ia Ga] IIC T6 Gb II 2 G Ex ib IIC T6 Gb II 1D Ex ia IIIC T100 °C Da	
Insulation resistance		Conformity statement	ZELM 11 ATEX 0471 X	
Test voltage	500 V AC for 60 s	<ul> <li>"Operating equipment that is non-</li> </ul>	II 3 G Ex ic IIC T6/T4 Gc	
Continuous operation     Electromagnetic compatibility	50 V AC/75 V DC	ignitable and has limited energy" type of protection (version: 7NG313x-2xxxx)	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA [ic] IIC T6/T4 Gc	
NAMUR	NE21	EC type test certificate	ZELM 11 ATEX 0472 X	
EMC 2004/108/EC Emission and Noise Immunity	EN 61326-1, EN 61326-2-5	<ul> <li>"Flame-proof enclosure" type of protection (version: 7NG313x-</li> </ul>	II 2 G Ex d IIC T6/T5 Gb II 2 D Ex tb IIIC T100 °C Db	
Construction		4xxxx)		
Weight	Approx. 1.5 kg (3.3 lb) without options	Explosion protection: FM for USA  • FM approval	FM 3017742	
Dimensions	See "Dimensional drawings"	Type of protection XP, DIP, NI and S	XP / I / 1 / BCD / T5,T6; Type 4X	
Enclosure materials	<ul> <li>Die-cast aluminum, low in copper, GD-AlSi 12 or stainless steel</li> <li>Polyester-based lacquer for GD</li> </ul>	(version 7NG313x-5xxxx)	DIP / II, III / 1 / EFG / T5,T6; Type 4X NI / I / 2 / ABCD / T5,T6; Type 4X	
	AlSi 12 enclosure		S / II, III / 2 / FG T5,T6; Type 4X	
Electrical connection, sensor con-	<ul><li>Stainless steel rating plate</li><li>screw terminals</li></ul>	Other certificates	EAC Ex(GOST), INMETRO, NEPSI, KOSHA	
nection	• Cable inlet via M20 x 1.5 or ½	Communication	TVET OI, TVOOT II V	
	<ul><li>-14 NPT screwed gland</li><li>• Bus connection with M12 plug</li></ul>	Parameterization interface		
Manustin of least testing 1	(optional)	PROFIBUS PA connection	ASD constitutions of the	
Mounting bracket (optional)	Steel, galvanized and chrome- plated or stainless steel	- Protocol - Protocol	A&D profile, Version 3.0 EN 50170 Volume 2	
Degree of protection	IP66/67 to EN 60529	- Address (for delivery)	126	
Auxiliary power		- Function blocks	2 x analog	
Power supply  • Standard, Ex "d", Ex "nA", Ex "nL",	10.0 32 V DC	• FOUNDATION fieldbus connection	J	
XP, NI		- Protocol	FF protocol	
• Ex "ia", Ex "ib"	10.0 30 V DC	- Protocol	FF design specifications	
In FISCO/FNICO installations	10.0 17.5 V DC	- Functionality	Basic or LAS	
Power consumption	< 11 mA	- Version	ITK 4.6	
Max. increase in power consumption in the event of a fault	< 7 mA	- Function blocks	2 x analog and 1 x PID	
		Factory setting		
		for SITRANS TH400 PA		
		Sensor	Pt100 (IEC)	
		Type of connection	3-wire circuit	
		Unit	°C	
		Failure mode	Last valid value	
		Filter time	0 s	
		PA address	126	
		PROFIBUS Ident No. for SITRANS TH400 FF	Manufacturer-specific	
		Sensor	Pt100 (IEC)	
		Type of connection	3-wire circuit	
		Unit	°C	
		Failure mode	Last valid value	
		Filter time	0 s	
		Node address	22	

## Transmitters for field mounting

## **SITRANS TF fieldbus transmitter**

Selection and Ordering data	Article No	_	=		
Temperature transmitter in field enclosure	7 N G 3 1 3				0
with fieldbus communication and electrical isolation, with documentation on MiniDVD					
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Integrated transmitter		П			
SITRANS TH400 with PROFIBUS PA		_			
<ul><li>Without Ex protection</li><li>With Ex ia (ATEX)</li></ul>		7	0		
With Ex nAL for zone 2 (ATEX)		7	2		
• Total device SITRANS TF Ex d <sup>1)</sup>		7	4		
<ul> <li>Total device SITRANS TF according to FM (XP, DIP, NI, S)<sup>1)</sup></li> </ul>		7	5		
SITRANS TH400, with FOUNDATION fieldbus					
Without Ex protection		8	0		
<ul><li>With Ex ia (ATEX)</li><li>With Ex nAL for zone 2 (ATEX)</li></ul>		8	1 2		
Total device SITRANS TF Ex d <sup>1)</sup>		8	4		
<ul> <li>Total device SITRANS TF according to FM (XP, DIP, NI, S)<sup>1)</sup></li> </ul>		8	5		
Enclosure					
Die-cast aluminium				A	
Stainless steel precision casting				E	
Connections/cable inlet Screwed glands M20x1.5				В	
Screwed glands 1/2-14 NPT				C	
Mounting bracket and fastening parts	-				
None					0
Made of steel Stainless steel					1
Further designs	Order co	de			
Please add "-Z" to Article No. and specify Order code(s) and plain text.					
Test report (5 measuring points)	C11				
Bus connection					
M12 plug (metal), without mating connector	M00 <sup>2)</sup>				
M12 plug (metal), with mating connector	M01 <sup>2)</sup>				
Explosion protection					
<ul> <li>Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG3131)</li> </ul>	E25				
<ul> <li>Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134)</li> </ul>	E26				
<ul> <li>Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG3132)</li> </ul>	E27				
<ul> <li>Explosion protection Ex i to NEPSI (China) (only with 7NG3131)</li> </ul>	E55				
<ul> <li>Explosion protection Ex d to NEPSI (China) (only with 7NG3134)</li> </ul>	E56				
<ul> <li>Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)</li> </ul>	E57				
<ul> <li>Explosion protection Ex d to KOSHA (Korea) (only with 7NG3134)</li> </ul>	E70				
Two coats of lacquer on casing and cover (PU on epoxy)	G10				
Transient protection	J01				
Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included	D57				
Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included	D58				
Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	D59				
Cable gland 1/2 NPT ADE 1F, cable diam. 4 8.5 (CAPRI 818674 and 810534) included	D60				
/ <del>-</del>					

Selection and Ordering data	Order code.
Customer-specific programming	
Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 <sup>3)</sup>
Meas. point no. (TAG), max. 32 characters	Y15 <sup>4)</sup>
Meas. point descriptor, max. 32 characters	Y23 <sup>4)</sup>
Meas. point message, max. 32 characters	Y24 <sup>5)</sup>
Bus address, specify in plain text	Y25 <sup>4)</sup>
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 <sup>6)</sup>
Pt100 (IEC) 3-wire	U03 <sup>6)</sup>
Pt100 (IEC) 4-wire	U04 <sup>6)</sup>
Thermocouple type B	U20 <sup>6)7)</sup>
Thermocouple type C (W5)	U21 <sup>6)7)</sup>
Thermocouple type D (W3)	U22 <sup>6)7)</sup>
Thermocouple type E	U23 <sup>6)7)</sup>
Thermocouple type J	U24 <sup>6)7)</sup>
Thermocouple type K	U25 <sup>6)7)</sup>
Thermocouple type L	U26 <sup>6)7)</sup>
Thermocouple type N	U27 <sup>6)7)</sup>
Thermocouple type R	U28 <sup>6)7)</sup>
Thermocouple type S	U29 <sup>6)7)</sup>
Thermocouple type T	U30 <sup>6)7)</sup>
Thermocouple type U	U31 <sup>6)7)</sup>
With TC: CJC: external (Pt100, 3-wire)	U41
With TC: CJC: external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09 <sup>8)</sup>
1) Without apple aland	

<sup>1)</sup> Without cable gland

<sup>&</sup>lt;sup>2)</sup> Not available for explosion protection Ex d or XP.

<sup>3)</sup> For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

<sup>4)</sup> If only Y15, Y23 or Y25 are ordered and the label <u>only</u> has to be on the tag plate, Y01 does not have to be specified.

<sup>&</sup>lt;sup>5)</sup> For this selection, Y01 or Y09 must also be selected.

<sup>6)</sup> For this selection, Y01 must also be selected.

 $<sup>^{7)}\,</sup>$  Internal cold junction compensation is selected as the default for TC.

For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Transmitters for field mounting

### **SITRANS TF fieldbus transmitter**

Selection and Ordering data	Article No.
Accessories	
MiniDVD for temperature measuring instruments	A5E00364512
with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)	
SIMATIC PDM parameterization software also for SITRANS TF with TH400 PA	see Sec. 8
Mounting bracket and fastening parts	
Made of steel for 7NG313B	7MF4997-1AC
Made of steel for 7NG313C	7MF4997-1AB
Made of stainless steel for 7NG313B	7MF4997-1AJ
Made of stainless steel for 7NG313C	7MF4997-1AH
Connection board	A5E02391790

Available ex stock.

### Ordering example 1:

7NG3137-0AB01-Z Y01+Y15+Y25+U03

Y01: -10 ... +100 °C Y15: TICA1234HEAT

Y25: 33

## Ordering example 2:

7NG3137-0AC01-Z Y01+Y15+Y25+U25

Y01: -10 ... +100 °C Y15: TICA 1234 ABC 5678

Y25: 35

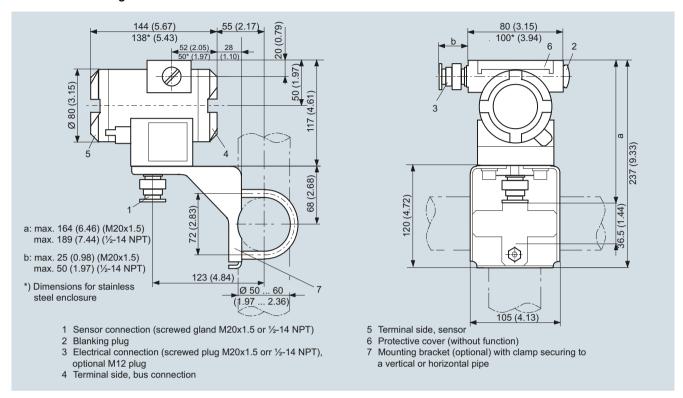
## Factory setting:

- for SITRANS TH400 PA:
  - Pt100 (IEC) with 3-wire circuit
  - Unit: °C
  - Failure mode: last valid value
  - Filter time: 0 s - PA address: 126
  - PROFIBUS Ident No.: manufacturer-specific
- for SITRANS TH400 FF:
  - Pt100 (IEC) with 3-wire circuit
  - Unit: °C
  - Failure mode: last valid value
  - Filter time: 0 s
  - Node address: 22

Transmitters for field mounting

**SITRANS TF fieldbus transmitter** 

# Dimensional drawings



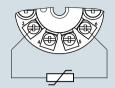
SITRANS TF with TH400, dimensions in mm (inches)

Transmitters for field mounting

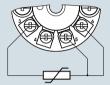
### **SITRANS TF fieldbus transmitter**

### Schematics

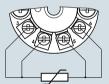
### Resistance thermometer



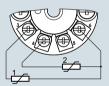
Two-wire system 1)



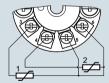
Three-wire system



Four-wire system



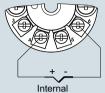
Mean-value/differential or redundancy generation 2 x two-wire system 1)



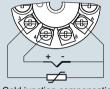
Mean-value/differential or redundancy generation

- 1 sensor in two-wire system 1)
- 1 sensor in three-wire system

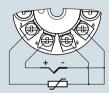
#### Thermocouple



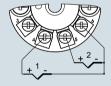
cold junction compensation



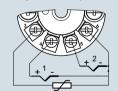
Cold junction compensation with external Pt100 in two-wire system 1)



Cold junction compensation with external Pt100 in three-wire system

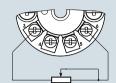


Mean value, differential or redundancy generation with internal cold junction compensation

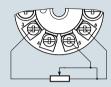


Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system <sup>1)</sup>

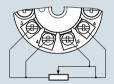
#### Resistance



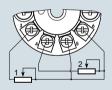
Two-wire system 1)



Three-wire system



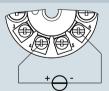
Four-wire system



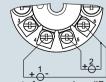
Mean value, differential or redundancy generation

- 1 resistor in two-wire system 1)
- 1 resistor in three-wire system

### Voltage measurement



One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

<sup>1)</sup> Programmable line resistance for the purpose of correction.

SITRANS TF with TH400, sensor connection assignment





3/2	Product overview		SITRANS F US (ultrasonic)
		3/311	Clamp-on ultrasonic flowmeters
	Introduction	3/313	System information
3/11	Criteria for selection of flowmeter	3/327	Thickness gauge
3/12	Communication solutions	3/328	SITRANS FUS1010 (Standard)
	CITDANC E M (electromagnetic)	3/338	SITRANS FST020 (Basic)
0/40	SITRANS F M (electromagnetic)	3/342	SITRANS FUP1010 (Portable)
3/13 3/31		3/348	SITRANS FUP1010 Water/Liquid
3/3	Transmitters	0,010	Check metering kits
3/33		3/350	SITRANS FUE1010 (Energy)
3/45		3/358	SITRANS FUE1010 (HVAC) Check
0/40	Flow sensors	3,333	metering kit
3/50		3/360	SITRANS FUH1010 (Oil)
3/58		3/367	SITRANS FUG 1010 (Gas)
3/69		3/374	SITRANS FUG 1010 Gas Check
3/85		0/07-1	metering kit
3/92		3/375	SITRANS FUT1010 (Liquid and Gas)
3/10		3/385	Accessories/Spare parts
3/11		0/000	Accessories/opare parts
3/12			SITRANS F X (vortex)
0,	network applications (7ME6810)	3/393	SITRANS FX300
3/12			0.55 4.40 5.44
- 1	bulk metering (7ME6820)	0/444	SITRANS F VA
3/13		3/411	SITRANS FVA250 variable area meter
			SITRANS F O delta p - Primary
	SITRANS F C (coriolis)		differential pressure devices
3/14		3/420	Technical description
	Flowmeter	3/426	Pressure equipment directive 97/23/EC
3/14		3/429	SITRANS F O - Questionnaire online
3/15		3/430	Orifice plate with annular chamber
3/16		3/436	Orifice plate with single tapping
3/17		3/441	Metering pipe with orifice plate and annular
3/17		0, 111	chamber
0/40	Transmitter	3/445	Calculation of primary devices
3/18	· ·	0, 110	Calculation of primary devices
3/18 3/19			SITRANS F R (liquid meters)
			Rotary-piston meters and automatic batch-
3/19			meters
2/20	Flow sensors  - SITRANS FCS200	3/446	- Introduction
3/20		3/451	- Ordering data rotary-piston meters
3/20		3/456	- Ordering data automatic batchmeters
3/21		3/457	- Dimensional drawings
3/22		3/458	SITRANS F RA110 electric
0/22	IVIOL		flow register
	SITRANS F US (ultrasonic)	3/460	Pulser with inductive pick-up
3/23	Inline ultrasonic flowmeters		
3/23	System information		
	Transmitters		
3/24	4 - SITRANS FUS060		
3/25	1 - SITRANS FUS080/FUE080		
	Flowmeters		
3/25			
3/26			
3/27			
3/28	- SITRANS FUS380 standard		
3/28	· ·		You can download all instructions,
3/29			catalogs and certificates for SITRANS F
	Dimensional drawings and Schematics		free of charge at the following Internet

Siemens Fl 01 · June 2015

www.siemens.com/sitransf

address:

Energy calculator

- SITRANS FUE950

Product overview

# Overview

	Application	Description	Catalog page	Software for parameterization
SITRANS F M electromagnetic flow	vmeters - Pulsed DC magnetic flowme	ter		
	Designed in robust IP67 polyamide	Transmitter MAG 5000/6000	3/33	SIMATIC PDM
	enclosures for compact or remote mounting.	• Superior signal resolution for optimum turn down ratio		
-Mary	19", back of panel and front of panel enclosure program.	<ul> <li>Comprehensively self-diagnostic, for error indication and logging</li> </ul>		
The state of the s		<ul> <li>Multi-lingual display and keypad interface</li> </ul>		
		<ul> <li>Custody transfer approval: PTB K7.2, OIML R 117, OIML R 49 and MI-001</li> </ul>		
	Designed in robust die-cast aluminum enclosure for demanding applications	Transmitter MAG 6000 I/6000 I Ex • Remote and compact mounting with all	3/45	SIMATIC PDM
	and where explosion proof protection is necessary.	sensors		
( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		<ul> <li>Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet</li> </ul>		
63 13		• Ex Approval: ATEX, IECEx, FM, UL, CSA		
		Multi-lingual display and touchpad keypad		
		Comprehensively self-diagnostic		
	Designed for the general industry	Flow sensor MAG 1100	3/50	
B	environment The obstructionless performance of	<ul> <li>Metering tube DN 2 DN 100 (1/12" 4") flangeless design.</li> </ul>		
	this sensor is unaffected by the sus- pended solids, viscosity and tempera- ture challenges.	Communication modules: HART, Modbus, PROFIBUS,		
	talo chanongos.	FOUNDATION Fieldbus, DeviceNet		
		<ul> <li>Corrosion-resistant AISI 316 stainless steel housing.</li> </ul>		
		Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme  process modifies		
		process media.  • Temperature rating up to 200 °C		
		(390 °F) • Ex Approval: ATEX, FM		
	Specially designed for the food & bev-		3/58	
	erage and pharmaceutical industry	AISI 316 stainless steel enclosure	-,	
		Hygienic seal, 3A and EHEDG		
Maria Mariana A	CERTIFIED	Easy to clean		
The last the state of the state	V 3 6 1 8 2 2 3 7 7 0	<ul> <li>Supplied with connections according to your specification</li> </ul>		
	EHEDG:	• Ex Approval: ATEX, FM		
	TYPE EL SOPTEMBER 2001	_ · · • • • · · · · · · · · · · · · · ·		
	The MAG 3100 series with its flexibility	Flow sensor MAG 3100	3/69	
	in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media.	<ul> <li>For a wide range of pipe dimensions: DN 15 DN 2000 (½" 78")</li> <li>Wide range of liner and electrode materials</li> <li>High-temperature version for application with temperatures up to 180 °C (355 °F)</li> <li>High-pressure solutions</li> <li>Custody transfer approval:</li> </ul>		
		PTB, OÍML R 117		

	Application	Description	Catalog page	Software for parameterization
	Designed for all water and waste	Flow sensor MAG 5100 W	3/92	
10	water applications in water plants and industrial applications	• Metering tube DN 15 DN 1200 (DN 2000) (½" 48" (78"))		
		Hard Rubber or EPDM lining		
		<ul> <li>Integral grounding electrodes as standard</li> </ul>		
1		<ul> <li>Increased low flow accuracy for water leak detection</li> </ul>		
		<ul> <li>Drinking water approvals and custody transfer approvals, OIML R 49, MI-001 and PTB K7.2</li> </ul>		
SITRANS F M electromagnetic flow	wmeters - High-power AC magnetic flo	owmeter		
	Designed for heavy-duty applications	Transmitter TRANSMAG 2	3/104	SIMATIC PDM
	like pulp & paper stock over 3 %; heavy mining slurries and mining slur- ries with magnetic particles	<ul> <li>Magnetic flowmeter with a very strong pulsed AC magnetic field</li> </ul>		
	nes with magnetic particles	• PROFIBUS PA or HART communication		
		Comprehensive self-test function		
100 m		Ex approval:     ATEX, IECEx, FM, UL, CSA		
	Designed for heavy-duty applications- like pulp & paper stock over 3 %; heavy mining slurries and mining slur- ries with magnetic particles	Flow sensor 911/E	3/104	
10		• Metering tube: DN 15 DN 1000 (1/2" 40")		
1 2		• Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak		
		<ul> <li>Integral smartPLUG for storing of cali- bration values</li> </ul>		
		<ul> <li>Multi-lingual display and touchpad keypad</li> </ul>		
		Only remote version		
SITRANS F M electromagnetic flow	wmeters - Battery-operated magnetic	water meter		
	Battery-operated electromagnetic	Water meter MAG 8000	3/114	SIMATIC PDM and Flow Tool
	water meter for water applications within abstraction, distribution net- work, revenue metering and irrigation	<ul> <li>Battery- and/or mains power operated water meter</li> </ul>		and flow 1001
	non, rerende metering and imgation	• Metering tube DN 25 DN 1200 (1" 48")		
		<ul> <li>Remote and compact installation IP68/ NEMA 6P enclosure</li> </ul>		
		<ul> <li>Custody transfer approval: PTB K7.2, OIML R 49 and MI-001</li> </ul>		
		Drinking water approvals		
		<ul> <li>Communication modules: GSM/GPRS, Modbus, Encoder</li> </ul>		

	Application	Description	Catalog page	Software for parameterization
SITRANS F C mass flowmeters				
	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature and fraction  CERTIFIED  CHEDG	Flowmeters FC430 (Dual tube design)  • DN 15, DN 25, DN 50 and DN 80  • Flow from 0.2 181 000 kg/h (400 000 lb/h) - water  • Pipe material: AISI 316L  • Accuracy, typically: Flow: ≤ 0.1 %, Density: ≤ 0.005 g/cm³  • Liquid temp./pressure: -50 +200 °C (-58 + 392 °F)/up to 100 bar (1450 psi)  • Approvals: ATEX, IECEX, FM CSA, NEPSI, OIML R 117, SIL 2/3, EHEDG, 3A	3/149	
	Designed for a variety of liquid and gas applications  Measurement of mass flow, density, temperature  Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages  Designed for accurate mass flow measurement of gases in high pressure applications	Flowmeters FC410 (Dual tube design)  • DN 15, DN 25, DN 50 and DN 80  • Flow from 0.2 181 000 kg/h (0.4 400 000 lb/h)  • Pipe material: AISI 316L or Hastelloy C22  • Accuracy, typically: Flow: ± 0.1 %, Density: ± 0.005 g/cm³  • Liquid temperature/pressure: -50 +200 °C (-58 +392 °F)/up to 160 bar (2321 psi)  • Approvals: ATEX, IECEX, FM CSA, NEPSI, OIML R 117, EHEDG, 3A  Flow sensor FCS200  • DN 10, DN 15, DN 25	3/156	
		Flow from 0 30 000 kg/h  Pipe material: Hastelloy C22  Accuracy: ± 0.5 % of rate  Process temperature: -40 +125 °C (-40 257 °F)  Pressure: Up to 350 bar  Ex approvals: ATEX, IECEx, FM  Custody transfer approval: PTB - OIML R 139  Flow sensors MASS 2100	2/200	
	Designed for a variety of liquid and gas applications	Flow sensors MASS 2100 (Single tube design) and FC300  • DI 1.5, DI 3, DI 6, DI 15, DI 25, DI 40 and DN 4  • Flow from 0.1 52 000 kg/h (114 640 lb/h)  • Pipe material: Stainless steel AISI 316L/ 1.4435; Hastelloy C22/2.4602  • Accuracy, typically: - Flow: ≤ 0.1 % of flow rate - Density: ≤ 0.0005 g/cm³  • Liquid temp./pressure: -50 +180°C (-58 +356 °F) / Up to 410 bar (5946 psi)  • Approved according to ATEX, UL	3/208, 3/212	

	Application	Description	Catalog page	Software for parameterization
	Measurement of liquids. Measurement of mass flow, density and temperature.		3/228	
	Measurement of liquids and gases Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato	Transmitters MASS 6000 (IP67, 19", Ex d)  • Superior signal resolution for optimumturn down ratio  • Comprehensively self-diagnostic, for error indication and logging  • Adaptive batch function  • Multi-lingual display and keypad interface  • Approvals: ATEX [EEx ia] IIC T6  • Ex Approval: ATEX, IECEx,C-UL  • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet	3/180, 3/194	SIMATIC PDM
	Measurement of liquids and gases Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato	Transmitters SIFLOW FC070 Standard and Ex CT  • Digital signal processing measuring 30 times a second.  • 3 current, 2 freq. and 2 relay outputs  • Adaptive batch function  • SENSORPROM memory unit making it easy to start up the flowmeter.  • Direct integration into SIMATIC S7 and SIMATIC PCS7  • Automation systems  • Ex approval: Ex Approval: ATEX, IECEx, FM  • Custody transfer approval: PTB - OIML R 139	3/199	SIMATIC PDM SIMATIC STEP 7 SIMATIC PCS 7
SITRANS F US ultrasonic inline flo	owmeters	. 12 0211 100		
	SITRANS FUS060 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the F US inline industry series up to DN 4000	SITRANS FUS060 transmitter  Die cast aluminum enclosure  EEx approved according to ATEX  HART communication + 1 analog output, 1 digital output for frequency or pulse and 1 relay output for alarms and flow direction  PROFIBUS PA communication with 1 digital output for frequency or pulse  Multi-functional output for process control  Easy menu based local operation with two-line display	3/244	SIMATIC PDM
- Monta	SITRANS FUS080 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the SONOKIT, FUS380 and FUE380 series up to DN 1200		3/251	SIMATIC PDM

	Application	Description	Catalog page	Software for parameterization
	The main application for SONO 3300	SONO 3300/FUS060	3/258	SIMATIC PDM
(5.3	ultrasonic flowmeters is to measure	ATEX-approved		
	the volume flow of:  • Water and treated waste water	• DN 50 DN 300 (2" 12") steel pipes		
	<ul><li>Oil and liquefied gases</li><li>Hot water/cooling systems</li></ul>	• PN 10 PN 40 or class 150 class 300 pressure rates		
""		• Flow 0.3 3200 m³/h (1.3 14 089 GPM)		
		No pressure drop		
		FUS060 transmitter for separate mounting		
		Signal cables from sensor to trans- ducer are highly protected from ag- gressive environment by stainless steel pipes		
	The main application for SONO 3100	SONO 3100/FUS060	3/264	SIMATIC PDM
	ultrasonic flowmeters is to measure	• DN 100 DN 600 (4" 24")		
P	the volume flow of:	Pipe in carbon steel		
8	<ul> <li>Water and treated waste water</li> </ul>	· ·		
	<ul><li>Oil and liquefied gases</li><li>Liquid cryogenic application</li></ul>	Transducers can be replaced under pressure  FUSCON transmitter for congrete.		
11/11/11	District heating systems	FUS060 transmitter for separate mounting     ATEX approved.		
		ATEX-approved		
		Measure of all liquids less than 350 Cst, conductive or non-conductive		
		No pressure drop		
		• 1-path; 4-path on request		
		Special material on request		
	Installation of one, two or four trans-	SONOKIT	3/273	SIMATIC PDM
	ducer sets in existing concrete or steel pipes. Typically installed in pipes with large diameters or in hot/cold water	FUS060 or FUS080 transmitter for separate mounting		
	applications	• DN 100 DN 4000 (4" 160")		
		Control and display unit		
200		• Temperature of medium: -20 +200 °C (-4 +395 °F)		
•		• Installation on empty pipes or pipes under pressure (hot-tap installation)		
		<ul> <li>Standard 1-path or 2-path (4-path on request)</li> </ul>		
<b>=</b>	Battery or mains-powered ultrasonic	FUS380/FUE380	3/284,	SIMATIC PDM
2020	flowmeter for use within water-based district heating, cooling systems and utility.	• FUS380/FUE380: DN 50 DN 1200 (2" 48")	3/289	
	The FUS380 can also be used for water irrigation systems.	<ul> <li>FUE380: Approved for custody transfer according to EN 1434 Class 2, OIML R 75, MID and MI004</li> </ul>		
	SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator.	FUS380/FUE380: Red brass or painted carbon steel flanges and metering tube. AISI transducers		
		• Water temperatures 2 200 °C (35.6 392 °F)		
		Battery or mains-powered		
	Universal thermal energy calculator	SITRANS FUE950	3/300	
CEPTATION CEPTATION	for district heating and cooling appli-	Battery or mains-powered		
00m	cations.	• 24 periods memory		
( ) Signal Signa		• 2 ports for plug-in modules as data output, extra input, M-Bus,		
		RS 232/RS 485, current output  • Complete set with temperature sensors		
		and pockets  • MID heating approval, PTB K7.2		
		cooling approval, MI004 type approval		

	Application	Description	Catalog page	Software for parameterization
SITRANS F US ultrasonic clamp-o	n flowmeters		1.3.	
	The thickness gauge can be used in any field application where there is a need for flow measurement. Including but not limited to:  • Water and waste water  • Energy measurement  • Oil and gas industries	Thickness gauge The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or nonmetallic pipes.  • Materials include steel, aluminum, titanium, plastics and ceramics  • Measurements shown in millimeter or inches  • Simple-to-read 4-digit LCD display  • Weights 150 g (5.3 oz)  • Battery operation for 250 h	3/327	
	Dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the:  • Water Industry  • Wastewater Industry  • HVAC Industry  • Power Industry  • Processing Industry	SITRANS FUS1010 General purpose  Suitable for virtually any liquid, even those with high aeration or suspended solids  Full range of safety approvals, I/O's and enclosure types available  Has wide applicability but not the special functions found in FUH1010, FUG1010 and FUE1010 meters  Hazardous area approvals: FM, CSA, ATEX	3/328	
	Dedicated flowmeter is a basic option for many clean liquid applications in the:  • Water Industry  • Wastewater Industry  • HVAC & Power Industries  • Processing Industry	SITRANS FST020 Basic  Has FUS1010 system function but without the same I/O capability or safety approval ratings  This basic meter is intended for single liquid applications that do not require these features  Not available with hazardous area approvals  Unclassified, ordinary locatons approvals: UL, C-UL, CE and C-TICK	3/338	
	Portable flowmeters are suitable for a wide variety of liquid applications, including those in the:  • Water Industry  • Wastewater Industry  • HVAC Industry  • Power Industry  • Processing Industry	SITRANS FUP1010 Portable  Basic function portable meter  Has all the capabilities of the FUS1010 meter but in a battery-powered, portable configuration  Ideal for high-accuracy flow survey applications  Not available with hazardous area approvals  Unclassified, ordinary location approvals: UL, C-UL, CE	3/342	
	The SITRANS FUP1010 check meter measures practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. This basic feature enables the perfomance check and verification of existing meters used in various water and wastewater applications such as:  • Water Industry - Raw water - Potable water - Chemicals  • Wastewater industry - Raw sewage - Effluent - Sludges - Mixed liquor - Chemicals	SITRANS FUP1010 Portable Check metering kit  Pipe sizes 25.4 mm 9.14 m (1" 360")  Current, voltage, frequency and RS 232 outputs  Optional current, voltage and temperature inputs  Zeromatic Path automatically sets zero Bi-directional flow operation  1 MByte data logger with both site and data logger storage	3/348	

Application	Description	Catalog page	Software for parameterization
Portable and dedicated energy meters are ideal for thermal energy/ power applications:  • Chilled & hot water submetering  • Condenser water, potable water  • Glycol and brine solution  • Thermal storage	SITRANS FUE1010 Energy  Accurate absolute and differential temperature measurement with two matched 1000 Ω RTD elements installed on supply and return side of the heating or cooling system  Efficiency calculation (kW/ton, EER or COP) available in systems with optional analog input  Dedicated available with hazardous area approvals: FM, CSA  Portable available with unclassified/ordinary locations approval: UL, C-UL, FM	3/350	
The SITRANS FUE1010 check metering kit is a highly accurate clamp-on non-intrusive ultrasonic flow display computer for revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real-time coefficient of performance (COP) for HVAC systems. This kit is ideal for applications which include:  • Chilled water sub-metering • Condenser water • Potable water • Ammonia and glycol • River and lake water • Lake source cooling	SITRANS FUE1010 HVAC Check metering kit  Pipe sizes 25.4 mm 9.14 m (1" 360")  Built-in energy/BTU mode  4-wire 1000 Ω platinum RTDs for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)  Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes: Cooling load (kW/ton) Coefficient of performance (COP) Energy efficiency ratio (EER)  Current, voltage, frequency and RS 232 outputs  1 MByte data logger with both site and data logger storage	3/358	
Dedicated hydrocarbon flowmeters are ideal for crude oil, refined petroleum or liquefied gas. There are three application areas:  • Viscosity compensated volumetric flowmeters  • Standard volume (Net) mass flowmeters  • Interface detectors/density meters	SITRANS FUH1010 Oil  Volumetric flowmeters output viscosity compensated gross volume to external RTU's or flow computers  Mass flowmeters output standard volume (net) mass flow, API, liquid identification, density, interface & pig detection  Interface Detectors are used for liquid identification and API density output, but do not output flow  Hazardous area approvals: FM, CSA, ATEX	3/360	
Dedicated gas flowmeters are ideal for most natural and process gas industry applications, including:  • Checkmetering  • Allocation  • Flow survey verification  • Lost and unaccounted for (LAUF) gas analysis  • Production	SITRANS FUG1010 Gas  Suitable for most gases (natural gas, oxygen, nitrogen, carbon monoxide, etc.) with typical minimum operating pressure of 10 bar g (145 psi g).  Standard volume or mass flow output for fixed gas compositions Analog input for pressure and temperature compensation  Hazardous area approvals: FM, CSA, ATEX	3/367	

	Application	Description	Catalog page	Software for parameterization
	The clamp-on SITRANS FUG1010 Gas Check Metering Kit is an all-inclusive solution developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The kit is ideal for applications that include:  • Check metering • Allocation • Flow survey verification • Lost and unaccounted for (LAUF) gas analysis • Production • Storage Ideal for applications within the liquid and gas hydrocarbon industry capable of providing custody transfer accuracy. Both versions are offered in pipe sizes ranging from 4" 24" (DN 100 DN 600) with flange ratings of ANSI Class 150/300/600 for liquid	PUG1010 Check Metering Kit Pipe sizes 50 1200 mm (2 48") up to 15.7 mm (0.62") pipe wall thickness Analog inputs for pressure and temperature Internal AGA-8 table for fixed gas composition is available for standard volume computation Upward compatibility and compliance with AGA-10 speed of sound measurement practice Bi-directional flow operation  SITRANS FUT1010 Basic WideBeam technology allows for precision flow measurement by reducing the meter's sensitivity to changes in the medium's physical properties	3/374	parameterization
	and 300/600 for gas.	<ul> <li>TransLoc permanent mounting system ensures sealing and virtually no maintenance</li> <li>High viscosity range (up to 2800 Cst)</li> <li>Completely cavity free design which eliminates any signal degrading build-up or ports to clog</li> <li>Large bi-directional flow range</li> <li>Modbus RTU RS 232/485 output available.</li> <li>Dynamic Reynolds number compensation</li> </ul>		
SITRANS F X Vortex Flowmeter				
	Measurement of steam, gases and liquids in:  Chemical HVAC/Power plants Oil & Gas Food & Beverage Pharma	SITRANS FX300  • Flange DN 15 DN 300 (½" 12") Sandwich DN 15 DN 100 (½" 4")  • 2-wire device 4 20 mA, with integrated temperature and pressure sensors for compensation  • HART communication  • Medium temp.: -40 +240 °C (-40 +464 °F)  • Medium pressure: up to 100 bar (1450 psi)  • Hazardous area approvals: FM, CSA, ATEX  • Compact or remote mounted transmitter	3/393	

	Application	Description	Catalog page	Software for parameterization
SITRANS F VA variable area meter	rs			
	Measurement of flow of liquids and gases, also highly suitable for corrosive media, high temperatures and high pressures.	SITRANS FVA250  All-metal variable area meter with various float materials  Connections: DN 15 DN 100 (½" 4")  Temperature of medium: -20 °C +300 °C (-4 +572 °F)  Optionally available with analog output or contacts	3/411	
SITRANS F O delta p - primary diff	ferential pressure devices			
	Measurement of flow with orifice plates and metering pipes for mounting between flanges, e.g. together with SITRANS P transmitters, DS III HART, DS III PROFIBUS PA and DS III FOUNDATION Fieldbus series.	Nominal diameters DN 10 DN 1000 (0.4" 40")  Temperature of medium: -200 +500 °C (-328 +932 °F) for vapors, gases and liquids.  SITRANS P transmitters  DS III HART series  DS III PROFIBUS PA series  DS III FOUNDATION Fieldbus series	3/420	
SITRANS F R liquid meters				
	Rotary-piston meters Industrial design for measurement of flowing liquids	<ul> <li>DN 15 DN 80 (½" 3") for industrial requirements</li> <li>With the required registers and quantity-preset registers</li> <li>Temperature of medium: -30 +300 °C (-22 +572 °F)</li> </ul>	3/446	
	Automatic batchmeter Any quantity of liquid can be preselected and filled automatically.	• DN 25 DN 50 (1" 2") • Temperature of medium: -30 +300 °C (-22 +572 °F)	3/446	

Introduction

## Criteria for selection of flowmeter

## Overview

## Criteria for selection of flowmeter

Each method for measuring flow has specific properties, and each flow measuring point is characterized by specific requirements. The table shown below compares the properties of the various measuring instruments and thus provides assistance in selection of the optimum device.

This section of the field device catalog includes the following instruments for measuring flow:

- Electromagnetic
- · Coriolis mass flow
- Ultrasonic
- Vortex volumetric- and mass flow
- Variable area meter
- Orifice plate
- Rotary-piston meters and drum meters

Measuring princip	le	Electro- magnetic	Coriolis	Ultrasonic (inline)	Ultrasonic (clamp-on)	Vortex	Variable area meter	Orifice plate	Rotary-pis- ton meter
Medium		Liquid (conductive)	Liquid or gas	Liquid	Liquid or gas	Steam/vapor, gases, liquid	Liquid or gas	Liquid, vapor, gas	Liquid
Nominal diameter		DN 2 2000 (0.08" 78")	1.5150 mm (0.06" 6")	DN 504000 (2" 160") optional down to DN 15 (½")	6.4 mm 9.14 m (0.25"360")	DN 15 300 (½" 12")	DN 10 100 (0.4" 4") G½" G3"	DN 101000 (0.4" 40")	DN 15 80 (½" 3")
Temperature range	°C (°F)	-40 +200 (-40 +392)	-50 +180 (-58 +356)	-200 +250 (-328 +482)	-40 +120 (-40 +248)	-40 +240 (-40 +464)	-20 +300 (-4 +572)	-200 +500 (-328 +932)	-30 +300 (-22 +572)
Max. pressure	bar (psi)	160 (2 320), optional higher	Up to 410 (Up to 5 950)	40 (580) optionally 160 (2 320)	Unlimited	100 (1 450)	100 (1 450)	315 (4 569)	63 (914)
Accuracy	%	± 0.2 or ± 0.4	± 0.1 or ± 0.15	± 0.5 ± 2	0.5 1.0 % of flow, for veloc- ities greater than 0.3 m/s (1 ft/s)	±0.75 ± 1	± 1.6 ± 2.0	± 0.5 ± 2	± 0.2 ± 0.5
Repeatability	%	0.1/0.2	0.05	0.25	0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	0.1	0.5	0.5	0.005
Dynamic response range		1:100	1:100	1:100	1:100	1:25	1:10	1:6	1:10
Start-of-scale value	m/s (ft/s)	0 (0)	0 (0)	0 (0)	0 (0)	0.4 (1.31) 2.0 (6.56)	0.2 (0.66)	Re > 500	0.3 (0.98)
Full-scale value					± 36/120			Re < 10 <sup>8</sup>	
• For liquids	m/s (ft/s)	0.25 10 (0.825 32.8)	10 (32.8)	10 (32.8)	± 12/40	10 (32.8)	3.5 (11.4)	3 (9.8)	3 (9.8)
For steam/vapor, gases	m/s (ft/s)		Approx. 300 (1000)		± 12/40	80 (262.5)	60 (197)	50/25 (164/82)	
Measured values									
Volume flow		•	•	•	•	•	•	•	•
Sound velocity				•	•				
Sound amplitude				•	•				
Density			•		•				
Mass flow			•	•	•	•			
Bidirectional measurement		•	•	•	•			•	
Use									
For custody transfer		•	•	•	•				•
As batching system		•	•		•				•
In viscosity range	mPa·s (cp)	0.1 100 000 (0.1 100 000)	0 100 000 (0 100 000)	0 350 (0 350)	0.5 2800 (0.5 2800)	0 10 (0 10)	0.5 100 (0.5 100)	0 10 (0 10)	0.3 350 000 (0.3 350 000)
Power supply		Mains or battery	Mains	Mains or battery	90 240 V AC, 5060 Hz, 15 VA or 9 36 V DC, 10 W	2-wire	non	2-wire	non

Introduction

## **Communication solutions**

### Communication solutions

Transmitter	HART	PROFIBUS PA	PROFIBUS DP	FOUNDATION Fieldbus H1	DeviceNet	Modbus RTU	GSM/GPRS
SITRANS F M MAG 5000	• 1) 2) 4)						
SITRANS F M MAG 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 5000/6000 CT <sup>8)</sup>							
SITRANS F M MAG 6000 I	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 6000 I Ex	• 1) 2) 4) 5)	• 1) 5) 6) 7)					
SITRANS F M TRANSMAG 2	• 1) 4)	• 1) 6)					
SITRANS F M MAG 8000						• 1) 3) 10) 11) 12)	• 14)
SITRANS F C FCT030	• 1) 2) 4) 8)						
SITRANS F C MASS 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 10)	
SITRANS F C MASS 6000 Ex d	• 1) 2) 4) 5)	• 1) 5) 6) 7)		• 2) 4) 5)	• 5)		
SIFLOW FC070			• 13)			• 1) 10) 11)	
SITRANS FUS060	• 1)	• 1) 6)					
SITRANS FUS1010 <sup>9)</sup>						• 9) 10) 11)	
SITRANS FX300	• 1)						
SITRANS P DS III Differential pressure and flow	• 1) 2)	• 1) 2) 7)		• 2)			

<sup>1)</sup> Supports SIMATIC PDM
2) Supports AMS
3) Supports Siemens Flow Tool
4) Supports HH275/375
5) Pluggable add-on modules
6) Profile 2
7) Profile 3

<sup>8)</sup> CT versions are not approved with communication modules.
9) All wall mount models
10) RS 485
11) RS 232
12) IrDA (Infrared)
13) Connected to ET200M PROFIBUS interface
14) Only with 7ME6810

## Flow Measurement SITRANS F M

### System information SITRANS F M Electromagnetic flowmeters

## Overview

SITRANS F M electromagnetic flowmeters are designed for measuring the flow of electrically conductive mediums.

The full SITRANS F M program consists of three different types of flowmeters making Siemens unique in that it covers all possible applications where electromagnetic flowmeters are a suitable match:

**Modular pulsed DC flowmeters** cover all ordinary applications within all industries. The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task and application.



SITRANS F M products

**Battery-operated water meters** (fully electronic) are the perfect match for drinking water applications like network distribution, revenue metering and irrigation where mains power is not available. In addition, it complies with the MID (EU) and OIML R 49 water meter standards and has the MCERTS certificate.



SITRANS F M MAG 8000

**High-powered flowmeters** are used for difficult applications where other flowmeters cannot stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp and paper.



SITRANS F M 911/TRANSMAG 2

SITRANS F M

### System information SITRANS F M Electromagnetic flowmeters

#### Benefits



#### Greater flexibility

- Wide product program
- Compact or remote installation using the same transmitter and sensor
- USM II communication platform for easy integration with all systems

#### Easier commissioning of MAG 5000, 6000, 6000 I

All SITRANS F M pulsed DC electromagnetic flowmeters feature a unique SENSORPROM memory unit which stores sensor calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer specified settings are downloaded to the unit. Should the transmitter be replaced, the new transmitter will upload all previous settings and resume measurement without any need for reprogramming.

Further, the "fingerprint" used in connection with the SITRANS F M Verificator is stored during the initial sensor calibration.

#### Easier service

Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

### Room for growth

USM II the Universal Signal Module with "plug & play" simplicity, makes it easy to access and integrate the flow measurement with almost any system and bus-protocol and it ensures the flow-meter will be easy to upgrade to future communication/bus platforms.

### Application

Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries.

A prerequisite is that the medium must have a minimum conductivity. The temperature, pressure, density and viscosity have no influence on the result.

The main applications of the electromagnetic flowmeters can be found in the following sectors:

- · Water and waste water
- · Chemical industries
- · Pharmaceutical industries
- · Food and beverage industry
- · Mining, aggregates and cements industries
- Pulp and paper industry
- Steel industry
- · Power; utility and chilled water industry

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

## **Flow Measurement** SITRANS F M

# System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constrains might be related to some of the features:

















www.pia-portal.automation.

3101110113.001	
A	
PIA-Selector®	
PIA-Selector®	

MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	M/ 510	AG 0 W	911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810	7ME6880

Industry											
Water / waste water	XX			XX		Х	XXX	XXX	Х	XXX <sup>1)</sup>	XXX <sup>1)</sup>
Chemical	XXX	XXX	XX	XXX	XXX	XXX	Х	Х		Х	
Pharmaceutical	XX	XX	XXX	XX	XX	XX	Х	Х		Х	
Food and beverage	XX		XXX	Х	Х	Х	Х	Х		Х	
Mining, aggregates and cement	XX			XXX			Х	Х	XXX	Х	
HPI	XX	Х		XX	Х	XX	Х	Х		Х	
Other	XX	XX	XX	XX	XX	XX	XX	XX	XXX	Х	
Design		7.7.		7.21	701		70.	7.71	70.01		
Compact	•		•	•	•	•	•	•		•	•
Remote	•	•	•	•	•	•	•	•	•	•	•
Constant field (DC)	•	•	•	•	•	•	•	•		•	•
Alternating field (AC)			_		_		_		•		
Battery-operated constant field											
(DC)										•	•
Size											
DN 2 (1/12")	•										
DN 3 (1/8")	•										
DN 6 (1/4")	•										
DN 10 (3/8")	•		•								
DN 15 (½")	•	•	•	•	•	•	•		•		
DN 25 (1")	•	•	•	•	•	•	•	•	•	•	
DN 32 (11/4")			•								
DN 40 (1½")	•	•	•	•	•	•	•	•	•	•	
DN 50 (2")	•	•	•	•	•	•	•	•	•	•	•
DN 65 (2½")	•	•	•	•	•	•	•	•	•	•	•
DN 80 (3")	•	•	•	•	•	•	•	•	•	•	•
DN 100 (4")	•	•	•	•	•	•	•	•	•	•	•
DN 125 (5")				•	•	•	•	•	•	•	•
DN 150 (6")				•	•	•	•	•	•	•	•
DN 200 (8")				•	•	•	•	•	•	•	•
DN 250 (10")				•	•	•	•	•	•	•	•
DN 300 (12")				•	•	•	•	•	•	•	•
DN 400 (16")				•		-	•	•	•	•	•
DN 450 (18")				•			•	•	•	•	•
DN 500 (20")				•			•	•	•	•	•
DN 600 (24")				•			•	•	•	•	•
DN 700 (28")				•			•	•	•	•	
DN 750 (30")				•			•	•	•	•	
DN 800 (32")				•			•	•	•	•	
DN 900 (36")				•							
DN 1000 (40")				•							
DN 1050 (42")				•				•			
DN 1100 (44")				•			•	•		•	
DN 1200 (44")							•	•		•	
DN 1400 (48 )				•			•			•	
DN 1500 (60")				•				•			
				•				•			
DN 1600 (66")				•				•			
DN 1800 (72")				•				•			
DN 2000 (78")				•				•			

<sup>• =</sup> available, **X** = can be used, **XX** = often used, **XXX** = most often used

<sup>1)</sup> Not suitable for wastewater applications

SITRANS F M

## System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constrains might be related to

















some of the features: www.pia-portal.automation.

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A	
PSA-Selector®	

MAG 1100 MAG MAG 1100 HT 1100 F MAG 3100

MAG MAG 3100 HT 3100 P

MAG 5100 W

911/E

MAG 8000/ MAG 8000 MAG Irrigation 8000 CT

PIA-Selector®	
Process cor	1
Wafer design	1

PA-Selector*	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Process connection											
Wafer design	•	•									
Sanitary process connections			•								
Flanges				•	•	•	•	•	•	•	● <sup>3)</sup>
Flange norms											
EN 1092-1				•	•	•	•	•	•	•	●3)
ANSI B 16.5 class 150				•	•	•	•	•	•	•	●3)
ANSI B 16.5 class 300				•	•				•		
ASME B 16.47 class 150				•							
AWWA class D				•			•	•	•	•	
AS 2129				•	•						●3)
AS 4087, PN 16				•	•		•	•		•	
AS 4087, PN 21				•	•						
AS 4087, PN 35				•	•						
JIS 10K				•				•	•		
JIS 20K				•							
Pressure rating <sup>1)</sup>											
PN 6				•				•			
PN 10				•	•	•	•	•	•	•	
PN 16	•		•	•	•	•	•	•	•	•	
PN 25	•	•	•	•	•	•	•	•	•	•	
PN 40 PN 63	•	•	•	•	_	•	_	•			
PN 100				•							
Accuracy											
0.2 %	•	•	•	•	•	•	•	•		•	
0.4 %	•	•	•	•	•	•	•	•		•	
0.5 %									•		
0.8 %											•
Repeatability <sup>5)</sup>											
0.1 %	•	•	•	•	•	•	•	•		•	•
0.2 %									•		
Grounding electrodes, incl. <sup>2)</sup>				•		● <sup>4)</sup>	•	•	(●)	•	
Grounding rings premounted from factory											•

• = available

<sup>1)</sup> Pressure may be limited by the liner material chosen

<sup>&</sup>lt;sup>2)</sup> Not for PTFE liner.

<sup>3)</sup> Drilled pattern flange max. 7 bar (107 psi).

<sup>4)</sup> Optional on PFA

<sup>&</sup>lt;sup>5)</sup> Of actual flow for v  $\geq$  0.5 m/s (1.5 ft/s) and conductivity > 10  $\mu$ S/cm

## **Flow Measurement** SITRANS F M

## **System information SITRANS F M Electromagnetic flowmeters**

Please see product selector on the Internet, because some constrains might be related to

















MAG 8000/ MAG 8000 MAG Irrigation 8000 CT

some of the features: www.pia-portal.automation.

SIGITICI IS.CO	11
	1
PIA-Selector®	
100	

MAG	MAG	MAG _	MAG	MAG	MAG		AG	911/E
1100	1100 HT	1100 F	3100	3100 HT	3100 P	510	0 W	
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610

										8000 CT	
PIA-Selector®	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Materials/temperature:											
Liner material/max. tempera-											
tures 70.00											
NBR Hard Rubber: 70 °C (158 °F)							•				
EPDM: 70 °C (158 °F)				•			•			•	
Soft rubber: 70 °C (158 °F)				•					•		
PTFE: 100 °C (212 °F)				•							
PTFE: 130 °C (266 °F)					•	•			•		
PTFE: 180 °C (356 °F)					•				( ● ) <sup>1)</sup>		
Ebonite Hard Rubber: 95 °C (203 °F)				•				● <sup>3)</sup>	•		● <sup>3)</sup>
Linatex: 70 °C (158 °F)				•					•		
Ceramic: 150 °C (302 °F)	•		•								
Ceramic: 200 °C (392 °F)		• <sup>2)</sup>									
PFA: 100 °C (212 °F)				•							
PFA: 150 °C (302 °F)	•		•		•	•					
Novolak: 130 °C (266 °F)									•		
Electrodes											
Stainless steel				•	•				•		•
Hastelloy C	•		•	•	•	•	•	•	•	•	
Platinum	•	•	•	•	•				•		
Titanium				•	•				•		
Tantalum				•	•				•		
Flange/housing material											
Carbon steel				•	•	•	•	•	•	•	•
Stainless steel / carbon steel				•	•				•		
Polished stainless steel	•	•	•	•	•						
Approvals											
Custody transfer											
Cold water - MI-001 (EU)							•			•	
Cold water approval - OIML R 49/OIML R 49 MAA										•4)	
Cold water pattern approval - OIML R 49 (Denmark)							● <sup>4)</sup>				
Cold water pattern approval PTB (Germany)	<b>●</b> <sup>4)</sup>		● <sup>4)</sup>	<b>●</b> <sup>4)</sup>							
Hot water pattern approval - PTB (Germany)	<b>●</b> <sup>4)</sup>		● <sup>4)</sup>	<b>●</b> <sup>4)</sup>							
Other media than water pattern approval - OIML R 117 (Denmark)	● <sup>4)</sup>		● <sup>4)</sup>	<b>●</b> <sup>4)</sup>							
NMI 10											•
Chilled water pattern approval PTB K 7.2							● <sup>4)</sup>			● <sup>4)</sup>	
OE12/C 040 (Austria) Chilled water pattern approval							•				

<sup>● =</sup> available 1) 150 °C (302 °F)

<sup>2)</sup> Ex sensor: 180 °C (356 °F)

<sup>3) 70 °</sup>C (158 °F)

<sup>4)</sup> For verification submit Product Variation Request

SITRANS F M

## System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constrains might be related to

















some of the features: www.pia-portal.automation.

SIC	1110113.0	50111
	-	
PS	-Selector®	

MAG 1100 MAG 1100 HT

MAG 1100 F

MAG 3100

MAG 3100 HT MAG 3100 P MAG 5100 W

911/E

MAG 8000/ MAG 8000 MAG Irrigation 8000 CT

7ME6810 7ME6820 7ME6110 7ME6120 7ME6140 7ME6310 7ME6320 7ME6340 7ME6520 7ME6580 7ME5610 7ME6880

Approvals (continued)											
Hazardous areas											
ATEX - 2 GD (Zone 1/21)	•	•	•	•	•	•					
IECEx Gb Zone 1/21				•	•	•					
FM Class I/II/III, Div 1				● <sup>9)</sup>	●9)	● <sup>9)</sup>					
FM Class I, Zone 1/21				•	•	•					
FM Class I, Div 2	•	•	•	•	•	•	•	•			
CSA Class I, Zone 1/21				•	•	•					
CSA Class I, Div 2				•	•	•	•	•			
Hygienic											
EHEDG			•								
3A			•								
EC 1925:2003 European food contact material			•								
Drinking water											
WRAS (WRc) - (UK)				•			● <sup>4)</sup>	•		•	•
ANSI/NSF 61 (US)8)				● <sup>5)</sup>			•	•		•	•
ACS (FR) EPDM liner				•			•			•	
Belgaqua (B) EPDM liner				•			•			•	
DVGW-W270 (D) EPDM liner				•			•			•	
MCERTS (UK environmental)				● <sup>6)</sup>			•4)			•	
Other											
FM Fire Service (class number 1044)							● <sup>7)</sup>			● <sup>7)</sup>	
GOSS/GOST (Russia )	•	•	•	•	•	•	•			•	
CRN (Canada)	● <sup>1)</sup>		● <sup>1)</sup>	•	•		•				
PED 97/23 EC	•	•	•	•	•	•	•	•	•	•	
VdS							● <sup>3)</sup>				
Other national approvals, see internet	●8)	●8)	●8)	●8)	●8)	●8)	●8)	●8)	●8)	●8)	
Verificator compatible	● <sup>2)</sup>										
					6)						

<sup>• =</sup> available

<sup>1)</sup> Only PFA liner.

 $<sup>^{2)}\,\</sup>mbox{Only}$  in combination with MAG 5000 and MAG 6000 transmitters.

<sup>3)</sup> Only valid for DN 50 to DN 300 (2" to 12")

<sup>4)</sup> EPDM liner

<sup>&</sup>lt;sup>5)</sup> Only EPDM with Hastelloy electrodes

<sup>6)</sup> EPDM or PTFE liner with AISI 316 or Hastelloy electrodes.

<sup>&</sup>lt;sup>7)</sup> Sizes: DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges

<sup>8)</sup> Including Annex G

 $<sup>^{9)}</sup>$  Only DN 15 to DN 300 (½" to 12") with MAG 6000 I Ex, compact mounted

# **System information SITRANS F M Electromagnetic flowmeters**

Please see Product selector on the Internet, because some constrains might be related to some of the features:

www.pia-portal.automation.

















Industry Water / waste water Chemical	MAG 5000  7ME6910  XXX  X  X  XX  XX  XX	MAG 6000  7ME6920  XXX  XX  XXX  XXX	7ME6930  XX  XX	MAG 6000 I Ex 7ME6930	MAG 6000 + Ex Safety barrier 7ME6920	TRANSMAG 2 7ME5034	MAG 8000/ MAG 8000 CT 7ME6810 7ME6820	MAG8000 Irrigation 7ME6880
Industry Water / waste water Chemical	XXX X X XX XX	XXX XX XXX	XX	X	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Water / waste water Chemical	X X XX XX	XX XXX	XX					
Chemical	X X XX XX	XX XXX	XX					
	X XX XX	XXX				Х	XXX	XXX
	XX XX		VV	XXX	Х		Х	
Pharmaceutical	XX	YYY	XX	XXX	Х		Х	
Food and beverage		^^^	XX				Х	
Mining, aggregates and cement	.,	Х	XX	Х		XXX	Х	
HPI	X	Х	Х	XX			Х	
Other	XX	XX	XX	XX		XX	Х	
Design								
Compact	•	•	•	•			•	•
Remote	•	•	•	•	•	•	•	•
Constant field (DC)	•	•	•	•	•		•	•
Alternating field (AC)						•		
Battery-operated constant field (DC	C)						•	•
Enclosure transmitter								
Polyamide, IP67	•	•						
Die-cast aluminum			•	•		•		
Stainless steel		•					● <sup>1)</sup>	● <sup>1)</sup>
19" rack	•	•			•			
Back of panel	•	•			•			
Panel mounting	•	•			•			
IP67 wall mounting	•	•	•	•	•			
Accuracy								
0.2 %		•	•	•	•		•	
0.4 %	•						•	
0.5 %						•		
0.8 %								•
Repeatability <sup>3)</sup>								
0.1 %	•	•	•	•	•		•	•
0.2 %						•		
Communication								
HART	•	•	•	•	•	•		
PROFIBUS PA		•	•	•	•	•		
PROFIBUS DP		•	•		•			
FOUNDATION Fieldbus H1		•	•	•	•			
DeviceNet		•	•		•			
Modbus RTU/RS 485		•	•		•		● <sup>2)</sup>	● <sup>2)</sup>
Encoder interface module (Sensus protocol) for Itron 200WP radio							•	•
GSM/GPRS module							•	
Batching		•	•	•	•			

<sup>● =</sup> available, **X** = can be used, **XX** = often used, **XXX** = most often used

<sup>1)</sup> IP68 enclosure 2) Modbus RTU also as serial RS 232

 $<sup>^{3)}</sup>$  Of actual flow for v  $\geq$  0.5 m/s (1.5 ft/s) and conductivity > 10  $\mu S/cm$ 

SITRANS F M

# System information SITRANS F M Electromagnetic flowmeters

Please see Product selector on the Internet, because some constrains might be related to some of the features:

www.pia-portal.automation.siemens.com















	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Ex Safety barrier	TRANSMAG 2	MAG 8000/ MAG 8000 CT	MAG8000 Irrigation
PIA-Selector®	7ME6910	7ME6920	7ME6930	7ME6930	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Power supply								
24 V	● <sup>1)</sup>	● <sup>1)</sup>	•	•			● <sup>1) 2)</sup>	● <sup>1) 2)</sup>
115 V - 230 V	•	•	•	•	•	•	● <sup>2)</sup>	● <sup>2)</sup>
Battery							•	
Approvals								
Custody transfer								
Cold water - MI-001 (EU)	•	•					•	
Cold water pattern approval - OIML R 49 (Denmark)	•	•					•	
Cold water approval - OIML R 49/OIML R 49 MAA							•	
Cold water pattern approval PTB (Germany)	•	•						
Chilled water pattern approval PTB K 7.2	•	•					•	
Hot water pattern approval PTB (Germany)		•						
Other media than water pattern approval - OIML R 117 Denmark		•						
OE12/C 040 (Austria) Chilled water pattern approval	•	•						
Hazardous areas								
ATEX - 2 GD (Zone 1/21)				•	( <b>●</b> ) <sup>3)</sup>			
IECEx Gb Zone 1/21				•				
FM Class I/II/III, Div 1				● <sup>4)</sup>				
FM Class I, Zone 1/21				•				
FM Class I, Div 2/Zone 2	•	•	•					
CSA Class I, Zone 1/21				•				
CSA Class I, Div 2	•	•	•					
UL / C-UL- general safety	•	•			•			
Other								
FM Fire Service (1044)	•	•					•	
C - tick (Australia )	•	•	•	•	•			
GOSS / GOST (Russia )	•						•	
VdS	•	•						
Other national approvals, see internet	•	•	•	•	•	•	•	•
Verificator compatible	•	•						

 $<sup>\</sup>bullet$  = available

For more national approvals please check our internet page http://support.automation.siemens.com/WW/view/en/10806954/134200

<sup>1) 12/24</sup> V AC/DC

<sup>2)</sup> Main power with battery backup

<sup>3)</sup> Only sensor in hazardous area

 $<sup>^{4)}</sup>$  Only with sensors sizes DN 15 to DN 300 (½" to 12") compact

### **System information SITRANS F M Electromagnetic flowmeters**

# Practical examples of ordering

#### SITRANS F M compact installation

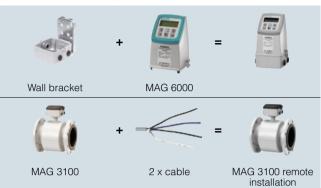


<u>Example</u>	
Sensor	7ME6310-3TC11-1JA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	MAG 6000, Polyamide, 115 230 V AC
Accuracy	± 0.2 % ± 1 mm/s
Supply	230 V AC

#### Note:

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place.

#### SITRANS F M remote installation



Examp	le

Sensor	7ME6310-3TC11-1AA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	7ME6920-1AA10-0AA0
Accuracy	± 0.2 % ± 1 mm/s
Supply	230 V AC
Wall mounting kit	FDK:085U1018
Cable kit with sensor cabel and electrode cable	A5E01181647

SITRANS F M

#### System information SITRANS F M Electromagnetic flowmeters

#### Technical specifications

#### Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

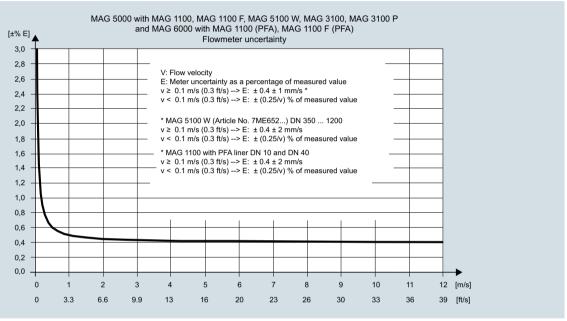
Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

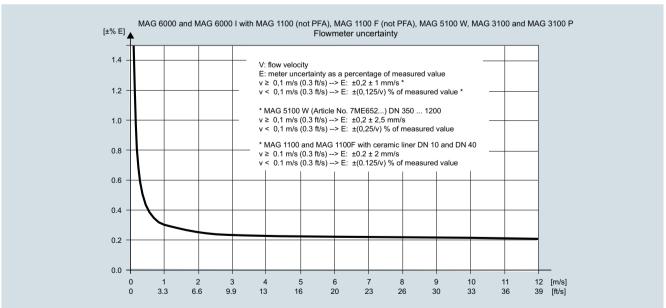
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m<sup>3</sup>/h to 10 000 m<sup>3</sup>/h.

Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.

#### Flowmeter uncertainty





# System information SITRANS F M Electromagnetic flowmeters

### Calibration reference conditions

Reference conditions (ISO 9104 ar	nd DIN EN 29104)
Temperature medium	20 °C ± 10 K (68 °F ± 18 °F)
Temperature ambient	25 °C ± 10 K (77 °F ± 18 °F)
Supply voltage	U <sub>n</sub> ± 1 %
Warming-up time	30 minutes
Incorporation in conductive pipe section	
Inlet section	10 x DN (DN ≤ 1200/48")
	5 x DN (DN > 1200/48")
Outlet section	5 x DN (DN ≤ 1200/48")
	3 x DN (DN > 1200/48")
Flow conditions	Developed flow profile
Additions in the event of deviation	s from reference conditions
Current output	As pulse output ( $\pm$ 0.1 % of actual flow + 0.05 % FSO)
Effect of ambient temperature	
• Display / frequency / pulse output	$< \pm 0.003$ %/K act.
Current output	$< \pm 0.005$ %/K act.
Effect of supply voltage	< 0.005 % of measuring value on 1% change
Repeatability	$\pm0.1$ % of actual flow for v $\geq 0.5$ m/s (1.5 ft/s) and conductivity > 10 $\mu S/cm$
Certificates	
• EN 10204-2.1	Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered. Available as Z option C15.
• EN 10204-2.2	Test report certificate, a non batch specific material analysis of the ordered material. Available as Z option C14.
• EN 10204-3.1	Material analysis certificate, a batch specific analysis of the material issued by an independent inspector. Certification covers all pressure containing and wetted parts. Available as Z option C12.

### SITRANS F M

# System information SITRANS F M Electromagnetic flowmeters

#### Technical specifications

3.00 Class B
No
1
1
2

Electrical specification DP	
Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbits/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two-wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 $\Omega$ at frequencies from 3 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm <sup>2</sup> , corresponds to AWG 22
Resistance	$<$ 110 $\Omega$ per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

#### Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 Kbits/second
Number of stations	Up to 32 per line segment, (maximum total of 126)
Max. basic current [I <sub>B</sub> ]	14 mA
Fault current [I <sub>FDE</sub> ]	0 mA
Bus voltage	9 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two-wire twisted pair
Conductor area (nominal)	0.8 mm <sup>2</sup> (AWG 18)
Loop resistance	44 <b>Ω</b> /km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	
Wave attendation at 66 Mile	3 dB/km
Capacitive asymmetry	3 dB/km 2 nF/km

Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact or remote mounted SITRANS F M MAG 6000 I Ex
FISCO	Yes
Max. U <sub>I</sub>	17.5 V
Max. I <sub>I</sub>	380 mA
Max. P <sub>I</sub>	5.32 V
Max. L <sub>I</sub>	0 μΗ
Max. C <sub>I</sub>	0 nF
FISCO cable requirements	
Loop resistance R <sub>C</sub>	15 150 Ω/km
Loop inductance L <sub>C</sub>	0.4 1 mH/km
Capacitance C <sub>C</sub>	80 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

#### PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.

MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services		
Input (Master view)	Parameter	MAG 6000/MAG 6000 I
	Mass flow	
	Volume flow	✓
	Temperature	
	Density	
	Fraction A <sup>1)</sup>	
	Fraction B <sup>1)</sup>	
	Pct Fraction A <sup>1)</sup>	
	Totalizer 1	<b>√</b>
	Totalizer 2 <sup>2)</sup>	<b>√</b>
	Batch progress <sup>2)</sup>	<b>√</b>
	Batch setpoint	<b>√</b>
	Batch compensation	<b>√</b>
	Batch status (running)	<i>,</i>
Output (Master view)	Set Totalizer 1+2	<b>√</b>
	Set Mode Totalizer 1+2	<b>√</b>
	Batch control (start, stop)	<b>√</b>
	Batch setpoint	<b>✓</b>
	Batch compensation	✓

<sup>1)</sup> Requires a SENSORPROM containing valid fraction data.

When ON, Batch progress is returned. When OFF, TOTALIZER 2 is returned.

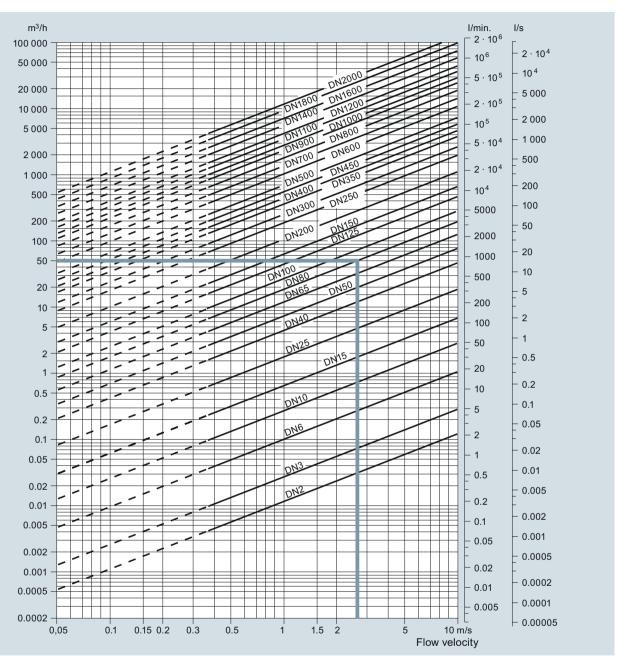
Max. bus length

<sup>&</sup>lt;sup>2)</sup> Value returned is dependent on the BATCH function.

### System information SITRANS F M Electromagnetic flowmeters

#### Flow and speed chart

#### Metric



Sizing table (DN 2 ... DN 2000)

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension DN.

#### Guidelines for selection of sensor

Min. measuring range: 0 to 0.25 m/s Max. measuring range: 0 to 10 m/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 1 to 3 m/s.

#### Example:

Flow quantity of 50 m $^3$ /h and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

#### Flow velocity calculation formula Units

 $v = 1273.24 \cdot Q / DN^2$  or v : [m/s], Q : [l/s], DN : [mm]  $v = 353.68 \cdot Q / DN^2$   $v : [m/s], Q : [m^3/h], DN : [mm]$ 

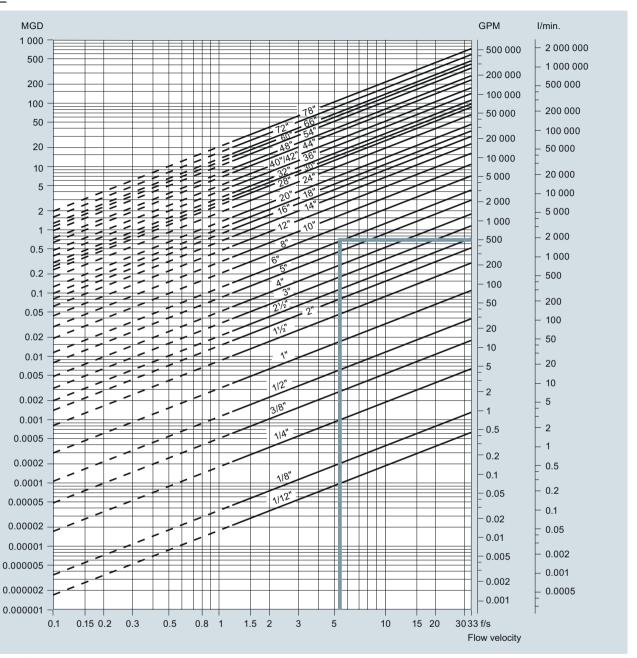
#### Link to "Sizing program":

https://pia.khe.siemens.com/index.aspx?nr=11501

SITRANS F M

#### System information SITRANS F M Electromagnetic flowmeters

#### Imperial



Sizing table (1/12" ... 78")

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension size.

### Guidelines for selection of sensor

Min. measuring range: 0 to 0.8 ft/s

Max. measuring range: 0 to 33 ft/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

#### Example:

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

#### Flow velocity calculation formula Units

 $v = 0.408 \cdot Q / (Pipe I.D.)^2 \text{ or } v : [ft/s], Q : [GPM], Pipe I.D. : [inch]$   $v = 283.67 \cdot Q / (Pipe I.D.)^2$  v : [ft/s], Q : [MGD], Pipe I.D. : [inch]

Link to "Sizing program":

https://pia.khe.siemens.com/index.aspx?nr=11501

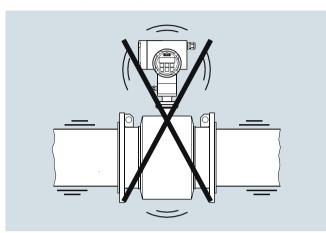
#### System information SITRANS F M Electromagnetic flowmeters

#### Installation conditions

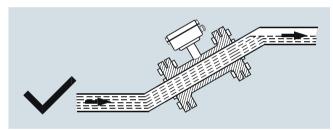
#### Vibrations

Strong vibrations should be avoided.

In applications with strong vibrations, remote mounting of the transmitter is recommended.



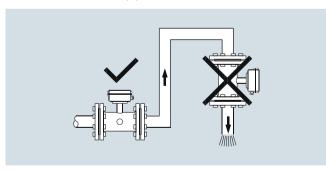
The sensor must always be completely filled with liquid.

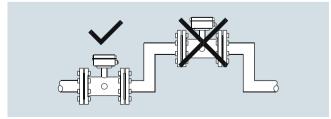


Install in pipelines which are always full

The sensor must always be completely filled with liquid. Therefore avoid:

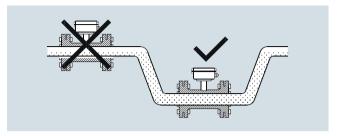
- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet





Do not install in pipelines which can run empty

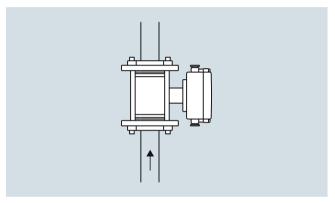
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-Tube.



Install in U-tubes when pipe is partially filled

#### Installation in vertical pipes

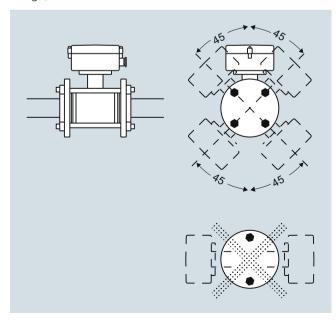
Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.



Install in vertical pipes with upward flow direction

#### Installation in horizontal pipes

The sensor must be mounted as shown in the below figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.

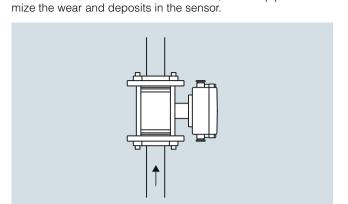


SITRANS F M

#### System information SITRANS F M Electromagnetic flowmeters

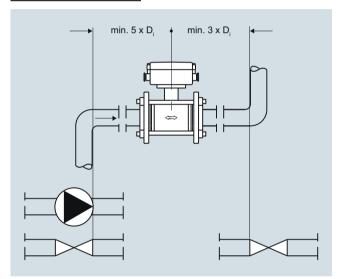
Measuring abrasive liquids and liquids containing particles

Recommended installation is in a vertical/inclined pipe to mini-



Install in vertical pipelines with upward flow direction if measuring abrasive liquids

#### Inlet and outlet conditions



Installation between elbows, pumps and valves: standard inlet and outlet pipe sections

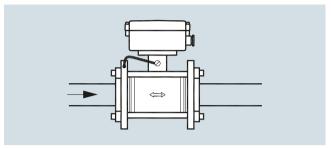
To achieve maximum accurate flow measurement it is essential to have straight length of inlet and outlet pipes and a certain distance between the flowmeter and pumps or valves.

It is also important to center the flowmeter in relation to pipe flange and gaskets.

#### Ambient temperature-Installation

Temperature changes can cause expansion or contraction in the pipe system. To avoid damage on the sensor use of proper gasket and torque should be ensured. For more information see sensor instruction.

#### Potential equalization

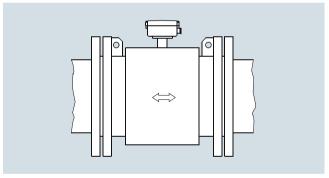


Potential equalization

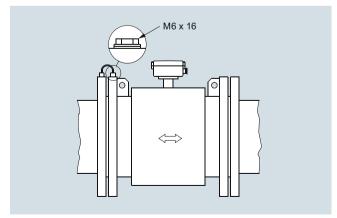
The electrical potential of the liquid must always be equal to the electrical potential of the sensor. This can be achieved in different ways depending on the application:

- Wire jumper between sensor and adjacent flange (MAG 1100, MAG 3100)
- Direct metallic contact between sensor and fittings (MAG 1100 F)
- Build-in grounding electrodes (MAG 3100, MAG 5100 W)
- Optional grounding/protection flanges/rings (MAG 1100, MAG 3100, MAG 8000)
- Optional graphite gaskets on MAG 1100 (standard for MAG 1100 High Temperature)
- MAG 8000 installed in plastic or coated pipes: two grounding rings to be used.

#### Grounding

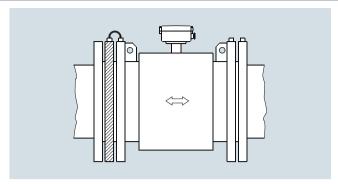


MAG 3100 (not PTFE), MAG 5100 W: with earthing electrodes in conductive and non-conductive pipes (no further action necessary)



MAG 1100, MAG 3100 (PTFE): without earthing electrodes in conductive pipes (MAG 1100 use graphite gasket)

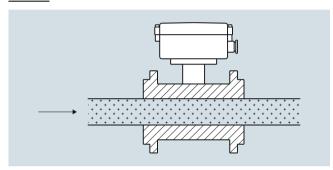
# System information SITRANS F M Electromagnetic flowmeters



Without earthing electrodes in non-conductive pipes use grounding ring (MAG 1100 use graphite gasket)

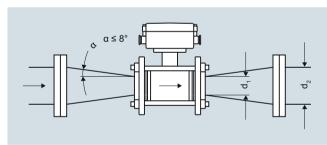
MAG 1100 F grounding via process connections. MAG 8000 grounding see MAG 8000 pages.

#### Vacuum



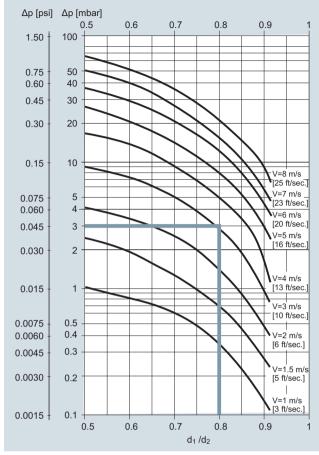
Avoid a vaccum in the measuring pipe, because this can damage certain liners.

#### Installation in large pipes



Reduction in nominal pipe diameter

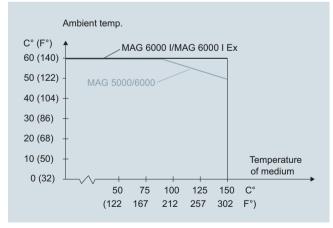
The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at  $8^{\circ}$  the following pressure drop curve applies. The curves are applicable to water.



Pressure drop as function of diameter reduction between reducers Example:

Flow velocity (v) of 3 m/s (10 ft/s) in a sensor with a diameter reduction DN 100 (4") to DN 80 (3") ( $d_1/d_2=0.8$ ) gives a pressure drop of 2.9 mbar (0.04 psi).

#### Ambient temperature



Max. ambient temperature as a function of temperature of medium. The transmitter can be installed either compact or remote.

With compact installation the temperature of medium must be according to the graph.

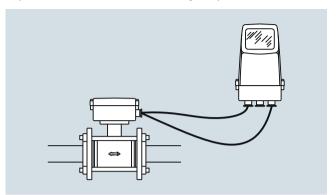
#### SITRANS F M

### System information SITRANS F M Electromagnetic flowmeters

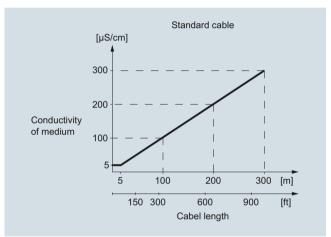
#### Sensor cables and conductivity of medium

#### Compact installation:

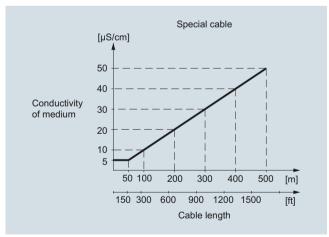
Liquids with an electrical conductivity  $\geq 5 \mu \text{S/cm}$ .



Remote installation



Minimum conductivity of medium (using standard electrode cable)



Minimum conductivity of medium (using special electrode cable)

#### Empty pipe detection

The installation has to fulfill the following limitations for usage of the empty pipe detection function:

- media conductivity ≥ 20 μS/cm
- length of cable at remote installation ≤ 50 m (150 ft)
- special shield cable must be used

#### Note for MAG 1100 sizes DN 2 and DN 3:

- empty pipe detection is not available
- the media conductivity must be  $\geq$  30  $\mu$ S/cm

#### Note for MAG 5000/6000 CT (FW 3.03):

• empty pipe detection is not available

SITRANS F M Verificator

#### Function

All electromagnetic flowmeters are based on Faraday's law of induction:

 $U_M = B \cdot v \cdot d \cdot k$ 

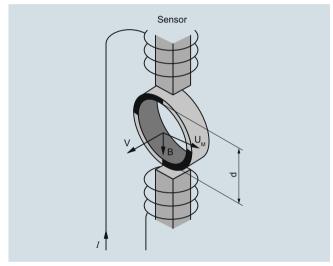
 $U_M$  = Measured voltage induced in the medium perpendicular to the magnetic field and the flow direction. The voltage is tapped at two point electrodes.

B = Magnetic flux density which permeates the flowing medium perpendicular to the flow direction.

v = flow velocity of medium

d = internal diameter of metering tube

k = proportionality factor or sensor constant



Function and measuring principle of electromagnetic measurement

An electromagnetic flowmeter generally consists of a magnetically non-conducting metering tube with an internal electrically non-conducting surface, magnet coils connected in series and mounted diametrically on the tube, and at least two electrodes which are inserted through the pipe wall and are in contact which the measured medium. The magnet field coils through which the current passes generate a pulsed electromagnetic field with the magnetic flux density B perpendicular to the pipe axis.

This magnetic field penetrates the magnetically non-conducting metering tube and the medium flowing through it, which must have a minimum electrical conductivity.

According to Faraday's law of induction, a voltage  $U_M$  is generated in an electrically conducting medium, and is proportional to the flow velocity  $\nu$  of the medium, the magnetic flux density B, and the distance between the electrodes d (internal diameter of pipe).

The signal voltage  $U_M$  is tapped by the electrodes which are in contact with the medium, and passed through the insulating pipe wall. The signal voltage  $U_M$  which is proportional to the flow velocity is converted by an associated transmitter into appropriate standard signals such as 4 to 20 mA.

#### SITRANS F M diagnostics

The diagnostic functions are all internal tools in the meter:

- Identification in clear text and error log
- Error categories: function; warning; permanent and fatal errors
- Transmitter self-check including all outputs and the accuracy
- Sensor check: coil and electrode circuit test
- Overflow
- Empty pipe: partial filling; low conductivity; electrode fouling

#### SITRANS F M Verificator (MAG 5000 and 6000)

The SITRANS F M Verificator is an external tool designed for MAG 5000 and MAG 6000 with MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P or MAG 5100 W sensors to verify the entire product, the installation and the application.

The goal is to improve operation, reduce downtime and maintain measurement accuracy as long as possible.

The SITRANS F M Verificator is highly advanced and carries out the complex verification and performance check of the entire flowmeter system, according to unique Siemens patented principles. The whole verification test is automated and easy to operate so there is no opportunity for human error or influence. The system is traceable to international standards and tested by WRc (Water Research Council).



#### SITRANS F M Verificator

- Stand alone Verificator to measure a number of selected parameters in the flow sensor and a transmitter which affects the integrity of the flow measurement
- Up to 20 measurements can be stored in the Verificator
- The Verificator can be connected via a serial cable to a PC enabling download of the data. A Windows program enables printing and management of verificator reports.

#### Verification - Steps

Verification of a SITRANS F M flowmeter consists of the following test routines:

- 1. Transmitter test
- 2. Flowmeter and cable insulation test
- 3. Sensor magnetism test

#### SITRANS F M

#### **SITRANS F M Verificator**

#### 1. Transmitter test

The transmitter test is the traditional way of on-site testing on the market and checks the complete electronic system from signal input to output.



Transmitter test

Using the excitation power output, which is generated to drive the magnetic field of the sensor, the verificator simulates flow signal to the transmitter input. By measuring the transmitter outputs the verificator calculates its accuracy against defined values. Test includes:

- Excitation power to drive the magnetic field
- Signal function from signal input to output
- Signal processing gain, offset and linearity
- Test of analogue and frequency output

#### 2. Insulation test



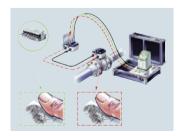
Flowmeter insulation test

The verification test of the flowmeter insulation is a "cross talk" test of the entire flowmeter which ensures that the flow signal generated in the sensor is not affected by any external influences

In the "cross-talk" test the verificator generates a high voltage disturbance within the coil circuit and then looks for any "cross-talk" induced in the flow signal circuit. By generating dynamic disturbances close-coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level:

- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes within the sensor
- Missing or poor grounding, shielding and cable connection.

#### 3. Sensor magnetism test



Sensor magnetism test

The verification of the sensor magnetism is a "boost" test of the magnetic field coil. The test ensures that the magnetism behaviour is like the first time, by comparing the current sensor magnetism with the "fingerprint" which was determined during initial calibration and stored in the SENSORPROM memory unit. In the "boost" test the verificator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is fulfilled without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection

#### Certificate

The test certificate generated by a PC contains:

- · Test result with passed or failed
- Installation specification
- Flowmeter specification and configuration
- Verificator specification with date of calibration ensuring traceability to international standards.

	r:			MAG	ìFL(	O® Identific	ation:		
Name				TAG	No.	/Name	0		
Address				Sen	sor C	Code No.	7ME634		
				Sen	sor S		057701H	142	
				Tran	smit	ter Code No.	7ME692		
Phone				Tran	smit	ter Serial No.	109418N	080	
Email				Loca					
Results:		Verif	cation file nam	e or No.	FI	Γ-103FT2801			
			smitter		Pa	assed			
		Sens				assed			
			Magnetic		Pa	assed			
Velocity			Current Outpu	t			Frequ	iency C	Output
Theoretica	al	Theoretical	Actual	Deviation	1	Theoretical	Actua	ı	Deviation
0.5m/s		4.800mA	4.802mA	0.25%		0.500kHz	0.501		0.11%
1.0m/s 3.0m/s		5.600mA 8.800mA	5.601mA 8.804mA	0.08%		1.000kHz 3.000kHz	3.004		0.07%
0.011/5		Current Output		0.00%		Frequency Ou			0.14/0
					_		.,		
ransmit	ter S	ettings:				Sensor De	tails:		
Basic	Qma		0.00000 2 //-						
			2.00000 m <sup>3</sup> /h			Size		DN .	15 1/2 IN
	Flow	Direction	Positive		-				
	Flow Low f	Direction flow Cut-off			-	Cal. Factor			15 1/2 IN 531426
Qutnut	Flow Low t Empt	Direction flow Cut-off ty Pipe	Positive 1.50% ON		- - -	Cal. Factor	actor	0.16	
Output	Flow Low t Empt	Direction flow Cut-off ty Pipe ent Output	Positive 1.50% ON ON (4-20mA)		-		actor		
Output	Flow Low t Empt Curre Time	Direction flow Cut-off ty Pipe ent Output Constant	Positive 1.50% ON		-	Cal. Factor		0.16	531426
Output	Flow Low t Empt Curre Time Relay Digita	Direction flow Cut-off ty Pipe ent Output Constant y Output al Output	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level		-	Cal. Factor		0.16	531426
Output	Flow Low 1 Empt Curre Time Relay Digita Frequency	Direction flow Cut-off ty Pipe ent Output Constant y Output al Output uency Range	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level Pulse		-	Cal. Factor	req.	0.16 1.0 12.5	531426 Hz
Output	Flow Low 1 Empt Curre Time Relay Digita Frequent Time	Direction flow Cut-off by Pipe ent Output Constant y Output al Output uency Range Constant	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level			Cal. Factor  Correction F  Excitation F	req.	0.16 1.0 12.5 6 (083F	531426 Hz
Output	Flow Low I Empt Curre Time Relay Digita Freque Volum Pulse	Direction flow Cut-off ty Pipe ent Output Constant y Output al Output uency Range Constant me/pulse e width	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level Pulse N/A N/A 1.0 l/p 0.51999998 sec	).	-	Cal. Factor Correction F Excitation F	req.	0.16 1.0 12.5 6 (083F	531426 Hz =5060)
·	Curre Time Relay Digita Frequ Time Volur Pulse Pulse	Direction flow Cut-off by Pipe ent Output Constant y Output al Output uency Range Constant me/pulse width p polarity	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level Pulse N/A N/A 1.0 Up 0.51999998 sec			Cal. Factor Correction F Excitation F  Verificator Serial No. Device No.	req.  Details	0.16 1.0 12.5 (083F 1079 946	531426  Hz  =5060) 920N490 83
Totalizer	Flow Low I Empt Currer Time Relay Digital Frequency Volume Pulse Pulse 1 value	Direction flow Cut-off by Pipe ent Output Constant y Output al Output al Output uency Range Constant medical Constant ent width polarity be before test	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level Pulse N/A N/A 1.0 I/p 0.51999998 sec Positiv 819442.93213 I			Cal. Factor Correction F Excitation F  Verificator Serial No. Device No. Software Ve	Details	0.16 1.0 12.5 (083F 1079 946 1.40	531426  Hz  =5060) 920N490 83
Totalizer Totalizer	Curre Time Relay Digital Frequence Volume Pulse Pulse 1 value	Direction flow Cut-off by Pipe ent Output Constant y Output al Output uency Range Constant me/pulse a width e polarity be before test a after test	Positive 1.50% DN (4-20mA) 5.0 Sec. Error Level Pulse N/A N/A 1.0 l/p 0.51999998 sec Positiv 819442.93213   8194458.92334			Cal. Factor Correction F Excitation F  Verificator Serial No. Device No. Software Ve PC-Software	Details	0.16 1.0 12.5 6 (083) 1079 946 1.40 5.01	531426  Hz  -5060) 920N490 83
Totalizer Totalizer Totalizer	Curre Time Relay Digita Frequ Time Volur Pulse Pulse 1 value 2 value 2 value 2 value	Direction flow Cut-off ty Pipe ent Output Constant y Output al Output uency Range Constant me/pulse o width e polarity e before test a after test b after test a after test	Positive 1.50% ON ON (4-20mA) 5.0 Sec. Error Level Pulse N/A N/A 1.0 I/p 0.51999998 sec Positiv 819442.93213 I			Cal. Factor Correction F Excitation F  Verificator Serial No. Device No. Software Ve	Details	0.16 1.0 12.5 (083F 1079 946 1.40 5.01 2012	531426  Hz  =5060) 920N490 83

Description	Article No.		
SITRANS F M Verificator			
• 11 30 V DC, 11 24 V AC, 115 230 V, 50 Hz	FDK:083F5060		
• 11 30 V DC, 11 24 V AC, 115 230 V, 60 Hz	FDK:083F5061		

#### Note:

It is mandatory to have the Verificator returned to the factory once a year for check and re-verification.

#### Transmitter MAG 5000/6000

#### Overview



Transmitter MAG 5000/6000 compact version (left) and 19" insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS F M sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error ± 0.4 % ± 1 mm/s (incl. sensor)
- MAG 6000: Max. measuring error ± 0.2 % ± 1 mm/s (incl. sensor, see also sensor specifications) and with additional features such as: "plug & play" add-on bus modules; integrated batch functions.

#### Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection.
- 3 lines, 20 characters display in 11 languages.
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see under SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: PTB, OIML R 117, OIML R 49, MI-001, PTB K 7.2 and OE12/C 040 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS 485, PROFIBUS PA and DP

#### Application

The SITRANS F M flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

### Design

The transmitter is designed as either IP67 NEMA 4X/6 enclosure for compact or wall mounting or 19" version as a 19" insert as a base to be used in:

- 19" rack systems
- Panel mounting IP20/NEMA 1 (prepared for IP65/NEMA 2 display side)
- Back of panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19" versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

#### Function

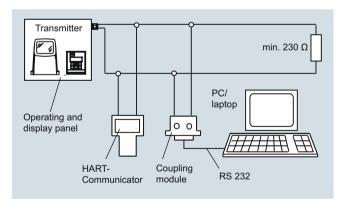
The MAG 5000/6000 are transmitters with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

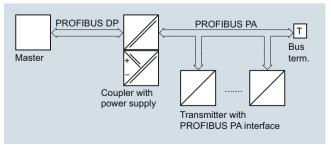
#### Displays and controls

Operation of the transmitter can be carried out using:

- · Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication



HART communication



PROFIBUS PA communication

SITRANS F M

# Transmitter MAG 5000/6000

Technical specifications	
Mode of operation and design	
Measuring principle	Electromagnetic with pulsed con-
Emptypipa	stant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted
	installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	11 30 V DC, $R_i$ = 4.4 K $\Omega$
Activation time	50 ms
Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}, I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
Signal range	0 20 mA or 4 20 mA
• Load	< 800 Ω
Time constant	0.1 30 s, adjustable
Digital output	
• Frequency	0 10 kHz, 50 % duty cycle
	(uni/bidirectional)
Pulse (active)	24 V DC, 30 mA,
	1 K $\Omega \le R_i \le 10$ K $\Omega$ , short-circuit- protected (power supplied from
	flowmeter)
<ul><li>Pulse (passive)</li></ul>	3 30 V DC, max. 110 mA,
	$200 \Omega \le R_i \le 10 K\Omega$ (powered from connected equipment)
Time constant	0.1 30 s, adjustable
Relay output	, ,
Time constant	Changeover relay, same as cur-
Time constant	rent output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvan-
	ically isolated.
Max. measuring error (incl. sen-	
sor and zero point)	
• MAG 5000	0.4 % ±1 mm/s
• MAG 6000	0.2 % ±1 mm/s
Rated operation conditions	
Ambient temperature	
Operation	Display version:
Operation	-20 +60 °C (-4 +140 °F)
	Blind version:
	-20 +60 °C (-4 +140 °F)
	,
	• MI-001 version -25 +55 °C (-13 +131 °F)
	· ·
	Custody Transfer (CT) version
	-20 +50 °C (-4 +122 °F)
Storage	-40 +70 °C (-40 +158 °F)
Mechanical load (vibration)	
Compact version	18 1000 Hz, 3.17 g RMS,
	sinusoidal in all directions to IEC 68-2-36
10" inport	
19" insert	1 800 Hz, 1 g, sinusoidal in all directions to IEC 68-2-36
Degree of protection	
	IDEZINEMA AVIO EN IEO EGO I
Compact version	IP67/NEMA 4X/6 to IEC 529 and DIN 40050 (1 mH <sub>2</sub> O 30 min.)
10" inport	IP20/NEMA 1 to IEC 529 and
19" insert	DIN 40050
EMC performance	IEC/EN 61326-1 (all environments)
	IEC/EN 61326-2-5

Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
<b>Display</b> Time constant	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign  Time constant as current output time constant
Design	
Enclosure material  Compact version  19" insert	Fiber glass reinforced polyamide; stainless steel AISI 316/1.4436 (IP65) Standard 19" insert of alumi-
Back of panel	num/steel (DIN 41494), width: 21 TE, height: 3 HE IP20/NEMA 1; Aluminum
<ul><li>Panel mounting</li><li>Wall mounting</li></ul>	IP20/NEMA 1 (prepared for IP65/NEMA 2 display side); ABS plastic IP66/NEMA 4X; ABS plastic
Dimensions	, - 1
Compact version	See dimensional drawings
19" insert	See dimensional drawings
Weight	
Compact version	0.75 kg (2 lb)
19" insert	See dimensional drawings
Power supply	• 115 230 V AC +10 % -15 %, 50 60 Hz
Power consumption	• 11 30 V DC or 11 24 V AC • 230 V AC: 17 VA
Power consumption	<ul> <li>230 V AC: 17 VA</li> <li>24 V AC: 9 VA, I<sub>N</sub> = 380 mA, I<sub>ST</sub> = 8 A (30 ms)</li> <li>12 V DC: 11 W, I<sub>N</sub> = 920 mA, I<sub>ST</sub> = 4 A (250 ms)</li> <li>24 V DC: 8.4 VA, I<sub>N</sub> = 350 mA, I<sub>ST</sub> = 4 A (10 ms)</li> <li>I<sub>ST</sub> = 4 A (250 ms):</li> <li>For solar panel please secure stable current supply</li> </ul>
Certificates and approvals	CE, C-UL general purpose, C-tick; FM Class I, Div 2, CSA Class I, Div 2
Custody transfer approval (MAG 5000/6000 CT)	<ul> <li>Cold water: MI-001, PTB/OIML R 49 (pattern approval DE/DK)</li> <li>Hot water: PTB and DANAK (MAG 6000 CT)</li> </ul>
	Chilled water: PTB K 7.2;     OE12/C 040
	<ul> <li>Other media than water (milk, beer etc.): PTB and DANAK OIML R 117 (pattern approval DE/DK) (MAG 6000 CT)</li> </ul>
Communication	
• MAG 5000	Without serial communication or HART as option
• MAG 6000	Prepared for client-mounted add- on modules
Optional (MAG 6000 only)	HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, Devi- ceNet, PROFIBUS PA, PROFIBUS DP as add-on modules
• MAG 5000/6000 CT	No communication moduls approved

# Transmitter MAG 5000/6000

# Safety barrier (e/ia)



Application	For use with MAG 5000/6000 19" and MAG 1100 Ex ATEX/MAG 3100 Ex ATEX					
Ex approval	MAG 1100 Ex [EEx e ia] IIB ATEX					
	MAG 3100 Ex [EEx e ia] IIC	ATEX				
Cable parameter	Group	Capacity in μF	Inductance in mH			
Electrode	IIC	≤ 4.1	≤ 80			
	IIB	≤ 45	≤ 87			
	IIA	≤ 45	≤ 87			
Ambient temperature	ature					
<ul> <li>During operation</li> </ul>	-20 +50 °C (-4 +122 °F)					
<ul> <li>During storage</li> </ul>	-20 +70 °C (-4 +158 °F	-20 +70 °C (-4 +158 °F)				
Enclosure						
Material	Standard 19" insert in alumi	Standard 19" insert in aluminum/steel (DIN 41494)				
• Width	21 TE (4.75")	21 TE (4.75")				
• Height	3 HE (5.25")	3 HE (5.25")				
Rating	IP20 / NEMA 1 to EN 60529	IP20 / NEMA 1 to EN 60529				
<ul> <li>Mechanical load</li> </ul>	1 g, 1 800 Hz sinusoidal	1 g, 1 800 Hz sinusoidal in all directions to EN 60068-2-36				

SITRANS F M

# Transmitter MAG 5000/6000

# Selection and Ordering data

### Transmitter MAG 5000

Description		Article No.	
Transmitter MAG 5000 Blind for compact and wall mount- ing; IP67/NEMA 4X/6, fibre glass reinforced polyamide			
• 11 30 V DC/ 11 24 V AC	•	7ME6910- 1AA30-0AA0	
• 115 230 V AC, 50/60 Hz	•	7ME6910- 1AA10-0AA0	AND THE REAL PROPERTY OF THE PERTY OF THE PE
Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide			
• 11 30 V DC/ 11 24 V AC	•	7ME6910- 1AA30-1AA0	Total Section
• 115 230 V AC, 50/60 Hz	•	7ME6910- 1AA10-1AA0	
• 115 230 V AC, 50/60 Hz, with HART	•	7ME6910- 1AA10-1BA0	
Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer (only with approval marks, no verification – only a complete flowmeter can be verified, i.e. sensor together with the transmitter);  IP67/NEMA 4X/6, fibre glass			- American Control of the Control of
reinforced polyamide  • 11 30 V DC/		7ME6910-	
11 24 V AC		1AA30-1AB0	
• 115 230 V AC, 50/60 Hz		7ME6910- 1AA10-1AB0	
Transmitter MAG 5000 for 19" rack and wall mounting			
• 11 30 V DC/ 11 24 V AC	•	7ME6910- 2CA30-1AA0	THE TANK
• 115 230 V AC, 50/60 Hz	•	7ME6910- 2CA10-1AA0	
<ul> <li>We can offer shorter delive</li> </ul>	ery t	imes for configur	ations designated with

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Transmitter MAG 6000

Transmitter MAG 6000			
Description		Article No.	
Transmitter MAG 6000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide			
• 11 30 V DC/ 11 24 V AC	•	7ME6920- 1AA30-0AA0	Andreas The second sec
• 115 230 V AC, 50/60 Hz	•	7ME6920- 1AA10-0AA0	and a
Transmitter MAG 6000 for compact and wall mount- ing; IP67/NEMA 4X/6, fibre glass reinforced polyamide			
• 11 30 V DC/ 11 24 V AC	•	7ME6920- 1AA30-1AA0	PRIMESS  Plant reports  State report
• 115 230 V AC, 50/60 Hz	•	7ME6920- 1AA10-1AA0	Ambatta
Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, stainless steel AISI 316/1.4436 (only for sensor with SS terminal box) (for remote installation order SS terminal box separately)			Manage Control of the
• 11 30 V DC/ 11 24 V AC		7ME6920- 1QA30-1AA0	•
• 115 230 V AC, 50/60 Hz		7ME6920- 1QA10-1AA0	
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer (no communication modules possible; only with approval marks, no verification – only a complete flowmeter can be verified, i.e. sensor together with the transmitter); IP67/NEMA 4X/6, fibre glass reinforced polyamide			MANUAL CONTRACTOR OF THE PARTY
• 11 30 V DC/ 11 24 V AC		7ME6920- 1AA30-1AB0	
• 115 230 V AC, 50/60 Hz		7ME6920- 1AA10-1AB0	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1" IP67/NEMA 4X/6, fibre glass reinforced polyamide			
11 30 V DC/ 11 24 V AC		7ME6920- 1AB30-1AA0	Areact Section 1
115 230 V AC, 50/60 Hz		7ME6920- 1AB10-1AA0	
Transmitter MAG 6000 for 19" rack and wall mounting			
• 11 30 V DC/ 11 24 V AC	•	7ME6920- 2CA30-1AA0	
• 115 230 V AC, 50/60 Hz	•	7ME6920- 2CA10-1AA0	

#### Transmitter MAG 5000/6000

Description	Article No.	
Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1"		NAME OF THE PARTY
• 11 30 V DC/ 11 24 V AC	7ME6920- 2CB30-1AA0	
• 115 230 V AC, 50/60 Hz	7ME6920- 2CB10-1AA0	
MAG 6000 with IP66/NEMA 4X enclosure; 115 230 V AC, 50/60 Hz; cable gland PG13.5	7ME6920- 2EA10-1AA0	
MAG 6000 with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure, ATEX, 115 230 V AC, 50/60 Hz; cable gland PG13.5		
• For ATEX 2G D sensors	7ME6920- 2MA11-1AA0	
MAG 6000 SV, 19" insert, in IP66/NEMA 4X , ABS plastic enclosure, excitation frequency 44 Hz for Batch application DN ≤ 25/1"; cable gland PG13.5		
• 11 30 V DC, 11 24 V AC, 50/60 Hz	7ME6920- 2EB30-1AA0	
• 115 230 V AC, 50/60 Hz	7ME6920- 2EB10-1AA0	

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Operating instructions for SITRANS F M MAG 5000/6000

Description	Article No.	
For SITRANS F M MAG 5000/6000 IP67		
• English	A5E02338368	
• German	A5E02944982	
<ul><li>Spanish</li></ul>	A5E02944995	
• French	A5E02944990	
For SITRANS F M MAG 5000/6000 19"		
• English	A5E02082880	

This device is shipped with a Quick Start guide and a CD containing further SITRANS  ${\sf F}$  literature.

#### All literature is also available for free at:

http://www.siemens.com/flowdocumentation

#### Communication modules for MAG 6000

Description		Article No.	
HART (not for MAG 6000 I)	•	FDK:085U0226	******
Modbus RTU/RS 485	•	FDK:085U0234	
PROFIBUS PA Profile 3	•	FDK:085U0236	SIEMENS HART CE
PROFIBUS DP Profile 3	•	FDK:085U0237	Cinde to: F DK 065.40226
DeviceNet	•	FDK:085U0229	Web released 1 & 2 Standar
FOUNDATION Fieldbus H1		A5E02054250	

# Operating instructions for SITRANS F add-on modules

, ,		
Description	Article No.	
HART		
• English	A5E03089708	
PROFIBUS PA/DP		
• English	A5E00726137	
<ul><li>German</li></ul>	A5E01026429	
Modbus		
• English	A5E00753974	
German	A5E03089262	
<ul><li>Spanish</li></ul>	A5E03089278	
• French	A5E03089265	
FOUNDATION Fieldbus		
• English	A5E02318728	
• German	A5E02488856	
<ul><li>Spanish</li></ul>	A5E02512177	
• French	A5E02512169	
DeviceNet		
• English	A5E03089720	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

#### Accessories for MAG 5000 and MAG 6000

Description		Article No.	
Wall mounting unit for IP67/ NEMA 4X/6 version, wall bracket, terminal box in polyamide <sup>1)</sup>			
• 4 x M20 cable glands	•	FDK:085U1018	
• 4 x 1/2" NPT cable glands		FDK:085U1053	
Sun lid for MAG 5000/6000 transmitter (Frame and lid)		A5E02328485	SIEMENS
Cable for standard electrode or coil, 3 x 1.5 mm² / 18 gage with shield PVC; Temperature range: -30 +70 °C (-22 +158 °F)			E
• 10 m (33 ft)	•	FDK:083F0121	
• 20 m (65 ft)		FDK:083F0210	
• 40 m (130 ft)		FDK:083F0211	
• 60 m (200 ft)		FDK:083F0212	
• 100 m (330 ft)		FDK:083F0213	
• 150 m (500 ft)		FDK:083F3052	
• 200 m (650 ft)		FDK:083F3053	
• 500 m (1650 ft)		FDK:083F3054	
- 14/			

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) For stainless steel wall mounting kit, order:
   M20: FDK:085U1018 and A5E00836867
   ½ NPT: FDK:085U1053 and A5E00836868

# SITRANS F M

# Transmitter MAG 5000/6000

Transmitter MAG 5000/0	יטפ	30	
Description		Article No.	
Electrode cable for empty pipe or low conductivity <sup>11</sup> , double shielded, 3 x 0.25 mm <sup>2</sup> . Temperature range: -30 +70 °C (-22 +158 °F)			
• 10 m (33 ft)	•	FDK:083F3020	
• 20 m (65 ft)		FDK:083F3095	
• 40 m (130 ft)		FDK:083F3094	
• 60 m (200 ft)		FDK:083F3093	
• 100 m (330 ft)		FDK:083F3092	
• 150 m (500 ft)		FDK:083F3056	
• 200 m (650 ft)		FDK:083F3057	
• 500 m (1650 ft)		FDK:083F3058	
Low-noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm <sup>2</sup>			
• 2 m (6.6 ft)		A5E02272692	
• 5 m (16.5 ft)		A5E02272723	
• 10 m (33 ft)		A5E02272730	
Cable kit with standard coil cable 1), 3 x 1.5 mm²/18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm² Temperature range: -30 +70 °C (-22 +158 °F)			
• 5 m (16.5 ft)	•	A5E02296329	
• 10 m (33 ft)	•	A5E01181647	
• 15 m (49 ft)	•	A5E02296464	
• 20 m (65 ft)	•	A5E01181656	
• 25 m (82 ft)	•	A5E02296490	
• 30 m (98 ft)		A5E02296494	
• 40 m (130 ft)		A5E01181686	
• 50 m (164 ft)		A5E02296498	
• 60 m (200 ft)		A5E01181689	
• 100 m (330 ft)		A5E01181691	
• 150 m (500 ft)		A5E01181699	
• 200 m (650 ft)		A5E01181703	
• 500 m (1650 ft)  Potting kit for terminal box of		A5E01181705 FDK:085U0220	
flow sensors for IP68/NEMA 6P		FDR.00300220	
19" safety barrier (21 TE) <sup>1)</sup> [EEx e ia] IIC for MAG 1100 Ex sensors and MAG 3100 Ex sensors 12 24 V, 115 230 V, incl. back plate (A5E02559810)		FDK:083F5034	
Panel mounting enclosure for 19" insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting		FDK:083F5030	
Panel mounting enclosure for 19" insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting		FDK:083F5031	

Description	Article No.	
Back of panel mounting enclosure for 19" insert (21 TE); IP20/NEMA 1 enclo- sure in aluminum	FDK:083F5032	
Back of panel mounting enclosure for 19" insert (42 TE); IP20/NEMA 1 enclo- sure in aluminum	FDK:083F5033	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814. Cable glands (FDK:083G0288) not included		
• 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	
Front cover (7TE) for panel mounting enclosure	FDK:083F4525	
Sun shield for remote MAG 5000/6000 transmit- ters	A5E01209496	
Sun Shield for compact MAG 5000/6000 transmitters on MAG 3100 (DN 15 2000 (½" 78") or MAG 5100 W (DN 150 1200 (6" 48")	A5E01209500	ations designeted with

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.
- 1) Special cables cannot be used with 19" safety barrier

# Transmitter MAG 5000/6000

Spare parts						
Description	Article No.					
Connection board (for polyamide terminalbox)						
• 12 24 V	A5E02559817					
• 115 230 V	A5E02559816					
Connection board (for stainless steel terminal-box)						
• 12 24 V	A5E02604280					
• 115 230 V	A5E02604272					
19" enclosure, 12 24 V, 115 230 V						
Connection board for stan- dard 19" transmitter	A5E02559809	5 SHIELD				
<ul> <li>Connection board for transmitter ia and safety barrier</li> </ul>	A5E02559810					
<ul> <li>Connection board for transmitter ia/ib and safety barrier (only for sensors produced before October 2007)</li> </ul>	A5E02559811					
<ul> <li>Connection board for transmitter and cleaning unit</li> </ul>	FDK:083F4123					
SENSORPROM memory unit (Sensor code and serial numbers must be specified on order)  • 2 kB		Suprovincial Street views				
(for MAG 5000/6000/ MAG 6000 I)						
- 1 pc.	FDK:085U1005					
- 10 pcs.	FDK:083F5052					
• 250 B (for MAG 2500/3000)	FDK:085U1008					
Display unit for MAG 5000/6000						
Black neutral front	FDK:085U1038					
• Siemens front	FDK:085U1039	SHMINS				
HW key	On request	50				

Description		Artiala NIa	
Description		Article No.	
Cable glands, for above cable, 4 pcs.			
• M20	•	A5E00822490	
• ½" NPT	•	A5E00822501	
• PG 13.5, 2 pcs.		FDK:083G0228	½" NPT M20
Sealing screws for sensor/ transmitter, 2 pcs		FDK:085U0221	<b>A</b> I
Terminal box, in polyamide, inclusive lid, terminal blocks, gasket and screws  • M20 • ½" NPT		FDK:085U1050 FDK:085U1052	
Terminal box lid, in polyamide		FDK:085U1003	
Terminal box, in stainless steel, inclusive lid, terminal blocks, gasket and screws, for MAG 6000 in stainless steel and for all Ex sensors,			
• M20		A5E00836867	
• ½" NPT		A5E00836868	
Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid, terminal blocks, gasket and screws • M20 • ½" NPT		A5E00822478 A5E00822479	
Wall unit enclosure IP66, 12 24 V, 115 230 V			
PCB for standard transmitter		A5E02559813	[1]
PCB for transmitter ia/e and safety barrier		A5E02559814	
PCB for transmitter ia/ib and safety barrier (7ME6130, 7ME6150 and 7ME6330)		A5E02559812	
<ul> <li>PCB for transmitter and cleaning unit</li> </ul>		A5E02559815	

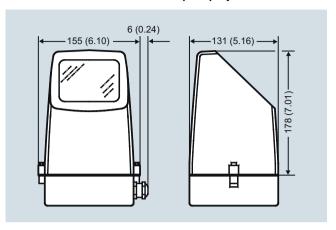
 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

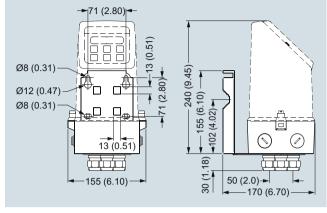
SITRANS F M

### Transmitter MAG 5000/6000

### Dimensional drawings

### Transmitter IP67/NEMA 4X/6 compact polyamide

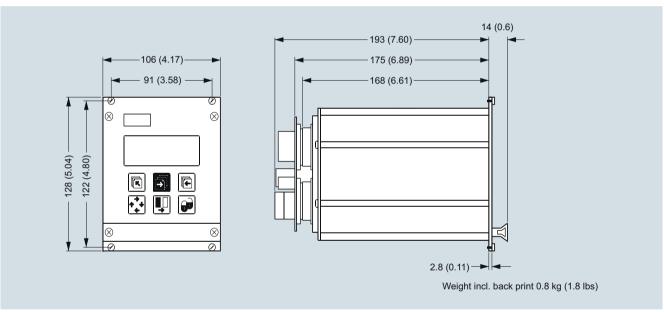




Transmitter compact mounted, dimensions in mm (inch)

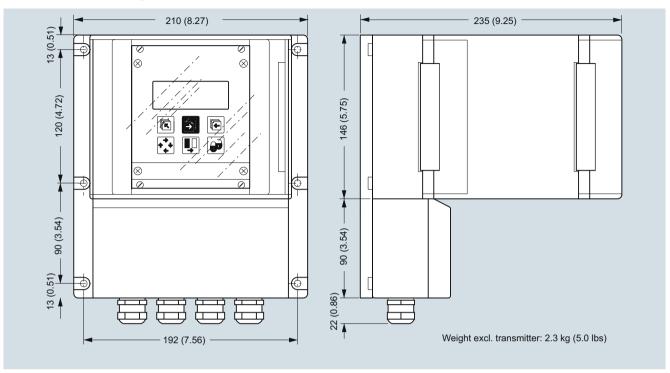
Transmitter wall mounted, dimensions in mm (inch)

#### Transmitter, 19" IP20/NEMA 1 standard unit



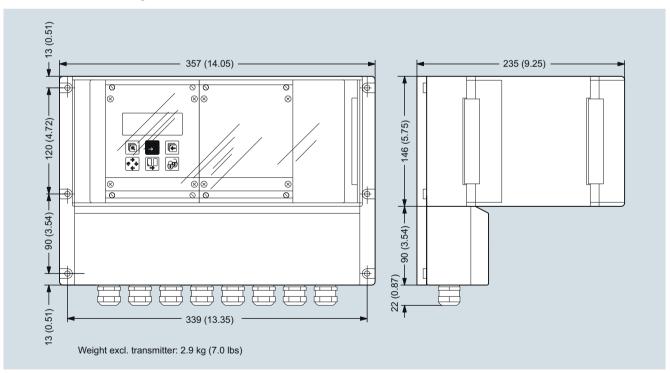
Transmitter MAG 5000/6000

### Transmitter, wall mounting IP66/NEMA 4X, 21 TE



Dimensions in mm (inch)

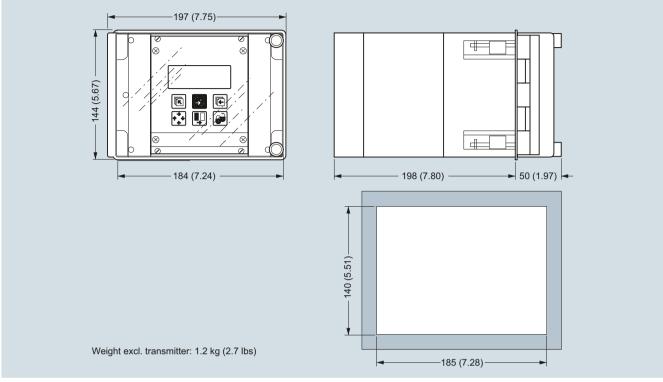
### Transmitter, wall mounting IP66/NEMA 4X, 42 TE



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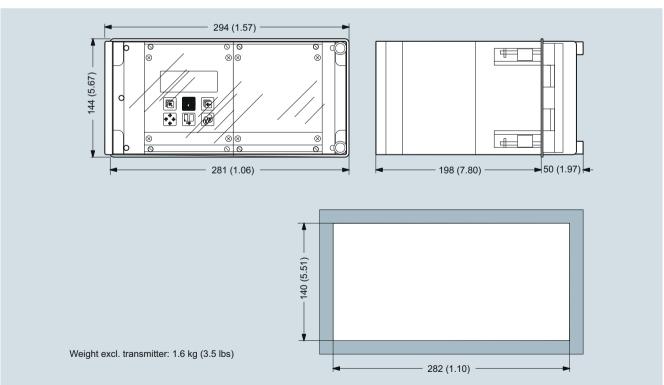
### Transmitter MAG 5000/6000

### Transmitter, panel front IP20/NEMA 1, 21 TE



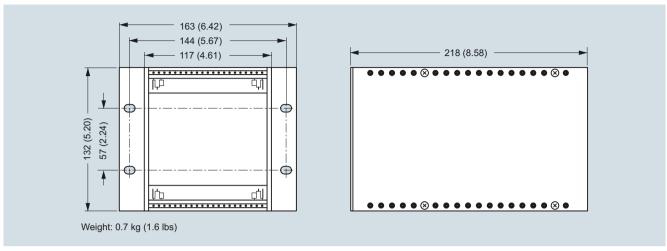
Dimensions in mm (inch)

### Transmitter, panel front IP20/NEMA 1, 42 TE



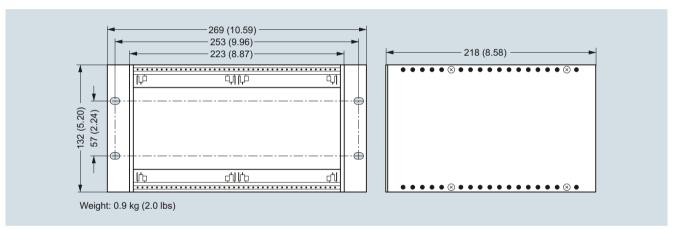
Transmitter MAG 5000/6000

### Transmitter, back of panel IP20/NEMA 1, 21 TE



Dimensions in mm (inch)

#### Transmitter, back of panel IP20/NEMA 1, 42 TE



#### SITRANS F M

#### Transmitter MAG 5000/6000

#### Schematics

#### Electrical connection

#### Grounding

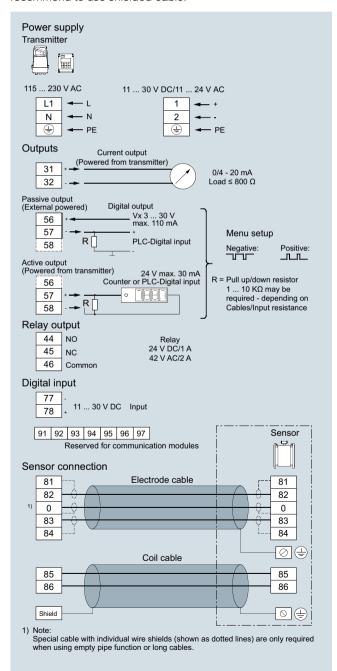
PE must be connected due to safety class 1 power supply.

#### Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a  $1000 \mu F$  capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

#### Output cables

If the output cable length is long in noisy environment, we recommend to use shielded cable.



#### Transmitter MAG 6000 I/6000 I Ex

#### Overview



The SITRANS F M MAG 6000 I/MAG 6000 I Ex transmitter is designed for the demands in the process industry. The robust die cast aluminum housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

#### Benefits

- · Full range of Ex-rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, Modbus RTU/RS 485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
- 3 lines, 20 characters display in 11 languages
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as much more information available.
- · Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- · Comprehensive self-diagnostic for error indication and error logging
- Batch control
- MAG 6000 I NAMUR: compliant with NAMUR NE 21, NE 32, NE 43, NE 53 and NE 70

#### Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensors).

#### Function

The following functions are available:

- Flow rate
- · 2 measuring ranges
- · 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- · Operating time
- Uni-/bidirectional flow

- · Limit switches and pulse output
- · Batch control

The MAG 6000 I/6000 I Ex is a microprocessor-based transmitter with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

#### Displays and keypads

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication

recimical specifications			
Mode of operation and design			
Measuring principle	Electromagnetic with pulsed constant field		
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)		
Excitation frequency	Depend on sensor size		
Electrode input impedance	$> 1 \times 10^{14} \Omega$		
Input			
Digital input	11 30 V DC, Ri = $4.4 \text{ k}\Omega$		
Activation time	50 ms		
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}, I_{30 \text{ V DC}} = 7 \text{ mA}$		
Output			
Current output			
Signal range	4 20 mA (active/ passive)		
• Load	< 560 Ω		
Time constant	0.1 30 s, adjustable		
Digital output			
Frequency	0 10 kHz, 50 % duty cycle (uni-/bidirectional)		
Time constant	0.1 30 s, adjustable		
• Pulse (passive)	$3 \dots 30 \text{ V DC}$ , max 110 mA (30 mA Ex version), $200 \Omega \le \text{Ri} \le 10 \text{ k}\Omega$ (powered from connected equipment)		
• Time constant	0.1 30 s, adjustable		
Relay output			
Time constant	Changeover relay, same as current output		
• Load	42 V AC/2 A, 24 V DC/1 A		
Low flow cut off	0 9.9 % of maximum flow		
Galvanic isolation	All inputs and outputs are galvanic isolated		
Max. measuring error			
MAG 6000 I/MAG 6000 I Ex (incl. sensor)	± 0.2 % ± 1 mm/s		

### SITRANS F M

### Transmitter MAG 6000 I/6000 I Ex

Transmitter WAG 6000 76000	
Rated operation conditions	
Ambient temperature	
Operation	
- MAG 6000 I	-20 +60 °C (-4 +140 °F)
- MAG 6000 I Ex	-20 +60 °C (14 140 °F)
Storage	-40 +70 °C (-40 +158 °F)
Mechanical load	18 1000 Hz random in x, y, z,
Wood a load	directions for 2 hours according to EN 60068-2-36
	Transmitter: 1.14 g RMS
Degree of protection	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH <sub>2</sub> O 30 min.)
EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5 NAMUR NE 21
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 charac- ters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by nega- tive sign
Keypad	Capacitive touch keypad with LED light for feedback indication
Time constant	Time constant as current output time constant
Design	
Enclosure material	Die cast aluminum, with corrosion resistant Basic Polyester powder coating (min. 60 µm)
Wall mounting	Wall mounting bracket enclosed for remote version
Dimensions	See dimensional drawings
Weight	See dimensional drawings
Power supply	<ul> <li>Standard transmitter: 18 90 V DC; 115 230 V AC +10 %/-15 %; 50 60 Hz</li> <li>Ex transmitter: 18 30 V DC</li> <li>Ex transmitter: 115 230 V AC; 50 60 Hz</li> <li>Ex transmitter NAMUR: 18 30 V DC; 115 230 V AC; 50 60 Hz</li> </ul>
Power consumption	• 230 V AC: 20 VA • 24 V DC: 9.6 W, I <sub>N</sub> = 0.4 A, I <sub>ST</sub> = 1 A (3 ms)
Certificates and approvals	
MAG 6000 I	• CE
MAG 6000 I Ex	C-tick  FM Class I, Div 2  FM Class I, Zone 2  CSA Class I, Div 2  IEC Ex de [ia] [ib] ia IIC T6 Gb Ex tDa 21 IP67  ATEX II 2(1)(2) GD EEx de [ia] ia [ib] IIC T6  FM Class I, Div 1 <sup>1)</sup>
	FM Class I, Zone 1     CSA Class I, Zone 1/21

Cable entries	Remote installation
MAG 6000 I	2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½" NPT (for supply/output) and 2 x M16 (for sensor connection)
MAG 6000 I Ex ATEX 2G D	2 x M20 (for supply/output) and 2 x M16 (for sensor connection)
Communication	
Standard versions	HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, Devi- ceNet, PROFIBUS PA, PROFI- BUS DP add-on modules
Ex versions	HART, PROFIBUS PA,
4)	

<sup>1)</sup> Applicable for: Compact mounted MAG 6000 I Ex on MAG 3100 (sizes DN 15 ... DN 300 (½" ... 12"))

(3)263 D14 10 D14 000 (72 12 ))					
Selection and Ordering data	Artic	le N	lo.		
SITRANS F M Transmitter MAG 6000 I/Ex	7 M E	6 9	3 0	-	
Remote with standard wall mounting bracket, local display, die cast aluminum	2 B A		- 1	A	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.					
Supply voltage					П
Standard transmitter:		2			
18 90 V DC; 115 230 V AC, 50 60 Hz					
Standard transmitter (NAMUR): 18 30 V DC; 115 230 V AC, 50 60 Hz		3			
Ex transmitter: 18 30 V DC		4			
Ex transmitter: 115 230 V AC, 50 60 Hz		5			
Ex transmitter (NAMUR):		6			
18 30 V DC; 115 230 V AC, 50 60 Hz					
Ex approval					
Standard sensor: FM Class I, Div 2, CSA Class I, Div 2		0			
Ex sensor: Hazardous area (ATEX 2 GD;		2			
FM Class I, Zone 1; CSA Class I, Zone 1)					
Communication					
None				A	
HART PROFIBUS PA Profile 3				B F	
PROFIBUS DP Profile 3 (not for Ex version)				G	
Modbus RTU/RS 485 (not for Ex version)				E	
FOUNDATION Fieldbus H1				J	
Cable gland entries					
Metric					0
½" NPT					2

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further design	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Other, post-production requirements (add plain text)	Y99

### Operating instructions for SITRANS F M MAG 6000 I

Description	Article No.
• English	A5E02083319
<ul> <li>German</li> </ul>	A5E02210835
• French	A5E02342413

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

### Transmitter MAG 6000 I/6000 I Ex

# Communication modules for MAG 6000 I (All standard outputs can still be used)

	,	
	Article No.	
•	FDK:085U0321	
	FDK:085U0234	14
•	FDK:085U0236	SIEMENS PROFIBUS PA CE
	FDK:085U0237	FOR DESIGNATION TO SEE SEE SEE
•	FDK:085U0229	
	A5E02054250	
	• • • •	<ul> <li>FDK:085U0321</li> <li>FDK:085U0234</li> <li>FDK:085U0236</li> <li>FDK:085U0237</li> <li>FDK:085U0229</li> </ul>

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART, English	A5E03089708	
PROFIBUS PA/DP • English • German	A5E00726137 A5E01026429	
Modbus • English • German • Spanish • French	A5E00753974 A5E03089262 A5E03089278 A5E03089265	
FOUNDATION Fieldbus  • English  • German  • Spanish  • French	A5E02318728 A5E02488856 A5E02512177 A5E02512169	
DeviceNet, English	A5E03089720	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

#### Accessories MAG 6000 I/MAG 6000 I Ex

Description		Article No.	
Cable for standard electrode or coil, 3 x 1.5 mm²/ 18 gage with shield PVC. Temperature range: -30 +70 °C (-22 +158 °F)			E.
• 10 m (33 ft)		FDK:083F0121	
• 20 m (65 ft)	•	FDK:083F0210	
• 40 m (130 ft)	•	FDK:083F0211	
• 60 m (200 ft)		FDK:083F0212	
• 100 m (330 ft)		FDK:083F0213	
• 150 m (500 ft)		FDK:083F3052	
• 200 m (650 ft)		FDK:083F3053	
• 500 m (1650 ft)		FDK:083F3054	
Electrode cable for empty pipe or low conductivity, dou- ble shielded, 3 x 0.25 mm <sup>2</sup> Temperature range: -30 +70 °C (-22 +158 °F)			
• 10 m (33 ft)	•	FDK:083F3020	
• 20 m (65 ft)		FDK:083F3095	
• 40 m (130 ft)		FDK:083F3094	
• 60 m (200 ft)		FDK:083F3093	
• 100 m (330 ft)		FDK:083F3092	
• 150 m (500 ft)		FDK:083F3056	
• 200 m (650 ft)		FDK:083F3057	
• 500 m (1650 ft)		FDK:083F3058	

Cable kit with standard coil cable, 3 x 1.5 mm²/18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm²			E
• 5 m (16.5 ft)		A5E02296329	-
• 10 m (33 ft)		A5E01181647	
• 15 m (49 ft)	•	A5E02296464	
• 20 m (65 ft)	•	A5E01181656	
• 25 m (82 ft)	•	A5E02296490	
• 30 m (98 ft)	•	A5E02296494	
• 40 m (130 ft)	•	A5E01181686	
• 50 m (164 ft)	•	A5E02296498	
• 60 m (200 ft)		A5E01181689	
• 100 m (330 ft)		A5E01181691	
• 150 m (500 ft)		A5E01181699	
• 200 m (650 ft)		A5E01181703	
• 500 m (1650 ft)		A5E01181705	
Low noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm <sup>2</sup>			
• 2 m (6.6 ft)		A5E02272692	
• 5 m (16.5 ft)		A5E02272723	
• 10 m (33 ft)		A5E02272730	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

#### Spare parts

<u> </u>		
Description	Article No.	
MAG 6000 I Display	FDK:085U3122	
Accessory bag including cable gland inserts coil and electrode connectors	FDK:085U3144	
Electronics cover with Ex glass plate. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. $60~\mu m$ ).	7ME5933- 0AC01	
Cover for connection board incl. gasket (for remote version). Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm).	7ME5933- 0AC02	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm).	7ME5933- 0AC03	

<sup>1)</sup> Not for Ex versions

### SITRANS F M

### Transmitter MAG 6000 I/6000 I Ex

Description	Article No.	
Safety clamp	7ME5933- 0AC06	
Standard wall mounting bracket. Steel AISI 316L/EN10088-2- 1.4404	7ME5933- 0AC04	
Wall-/pipe mounting bracket kit, BI 2.5 DIN59382 X6Cr17	7ME5933- 0AC05	

#### Complete spare part PCB unit

Description	Article No.	
MAG 6000 I PCBA (not for Ex)	FDK:085U3123	. 4-1
MAG 6000 I std. (NAMUR), 18 30 V DC; 115 230 V AC Spare PCBA unit	A5E31426892	<b>S</b>
MAG 6000 I Ex (NAMUR), 18 30 V DC; 115 230 V AC Spare PCBA unit for use with Ex sensors with increased safety e	A5E31426877 <sup>1)</sup>	
(For Ex sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340) (For 7ME6330 > DN300)		

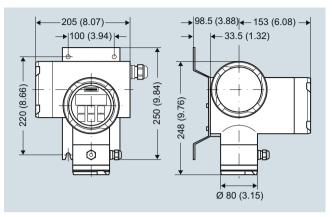
<sup>1)</sup> Ex spare parts may only be exchanged by "Siemens Ex Authorized personnel".

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

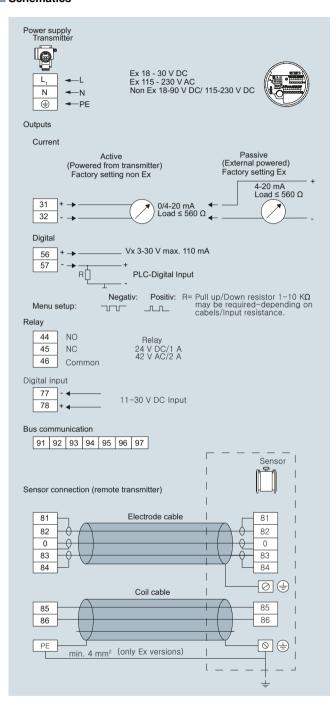
# Dimensional drawings



Dimensions in mm (inch), weight: 6 kg (13.5 lb)

Transmitter MAG 6000 I/6000 I Ex

# Schematics



SITRANS F M

#### Flow sensor MAG 1100 and MAG 1100 HT

#### Overview



The SITRANS F M MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

#### Benefits

- Sensor sizes: DN 2 to 100 (1/12" to 4")
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (392 °F)
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

#### Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- · Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

#### Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Simple on site upgrade to IP68/NEMA 6P terminal box
- Ex ATEX 2G D version
- FM Class I, Div 2

### Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

#### Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

# Flow sensor MAG 1100 and MAG 1100 HT

# Technical specifications

Version	MAG 1100	MAG 1100 HT (High temperature)
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 2 65 (1/12" 2½"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz	DN 15 50 (½" 2"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz
Process connection		
Nominal size		
MAG 1100 (Ceramic)	DN 2 DN 100 (1/12" 4")	DN 15 DN 100 (½" 4")
• MAG 1100 (PFA)	DN 10 DN 100 (3/8" 4")	
Mating flanges	or equivalent	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent
	Option: DN 2 10 (1/12" 3/8"): G½" / NPT ½" pipe connection adapters	
Rated operating conditions		
Ambient conditions		
Ambient temperature <sup>1)</sup>		
Standard sensor	-40 +100 °C (-40 +212 °F)	-40 +100 °C (-40 +212 °F)
• Ex sensor	-20 +60 °C (-4 +140 °F)	-20 +60 °C (-4 +140 °F)
Compact transmitter MAG 5000/6000 <sup>2)</sup>	-20 +60 °C (-4 +140 °F)	
Compact transmitter MAG 6000 I	-20 +60 °C (-4 +140 °F)	
<ul> <li>Compact transmitter MAG 6000 I Ex</li> </ul>	-20 +60 °C (-4 140 °F)	
Temperature of medium		
MAG 1100 (Ceramic)	-20 +150 °C (-4 +302 °F)	-20 +200 °C (-4 +392 °F)
MAG 1100 Ex (Ceramic)	-20 +150 °C (-4 +302 °F)	-20 +180 °C (-4 +356 °F)
• MAG 1100 (PFA)	-30 +130 °C (-22 +266 °F) Suitable for steam sterilization at 150 °C (302 °F)	
Temperature shock		
MAG 1100 (Ceramic)		
<ul> <li>Duration ≤ 1 min, followed by 10 min rest</li> </ul>	<ul> <li>DN 2, 3 (1/12", 1/8") No limitations</li> <li>DN 6, 10, 15, 25: Max. ΔT ≤ 80 °C/min</li> </ul>	• DN 15, 25: Max. ΔT ≤ 80 °C/min (½", 1": Max. ΔT ≤ 144 °F/min)
	(¼", $3/8$ ", ½", 1": Max. $\Delta T \le 144$ °F/min) • DN 40, 50, 65: Max. $\Delta T \le 70$ °C/min	• DN 40, 50: Max. ΔT ≤ 70 °C/min (1½", 2": Max. ΔT ≤ 126 °F/min)
	(1½", 2", 2½": Max. ΔT ≤ 126 °F/min)  • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min)	• DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min)
• MAG 1100 (PFA)	Max. ± 100 °C (212 °F) momentarily	
Operating pressure		
• MAG 1100 (Ceramic)	<ul> <li>DN 2 65: 40 bar (1/12" 2½": 580 psi)</li> <li>DN 80: 37.5 bar (3": 540 psi)</li> <li>DN 100: 30 bar (4": 435 psi)</li> </ul>	<ul> <li>DN 15 50: 40 bar (½" 2": 580 psi)</li> <li>DN 80: 37.5 bar (3": 540 psi)</li> <li>DN 100: 30 bar (4": 435 psi)</li> </ul>
	Vacuum: 1 x 10 <sup>-6</sup> bar <sub>abs</sub> (1.5 x 10 <sup>-5</sup> psi <sub>abs</sub> )	Vacuum: 1 x 10 <sup>-6</sup> bar <sub>abs</sub> (1.5 x 10 <sup>-5</sup> psi <sub>abs</sub> )
• MAG 1100 (PFA)	20 bar (290 psi)	
	Vacuum: 0.02 bar <sub>abs</sub> (0.3 psi <sub>abs</sub> ) DN 80 DN 100: CO <sub>2</sub> pressure max. 7 bar (101.5 psi)	
Mechanical load (vibration)	according to EN 60068-2-36	• 18 1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36
	• Sensor: 3.17 g RMS	• Sensor: 3.17 g RMS
	Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS     Sensor with compact MAG 6000 / 6000 / Fy mounted	
	<ul> <li>Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS</li> <li>For compact installation with the MAG 6000 I, transmit-</li> </ul>	
Foology we was to the second of the second	ter to be supported to avoid tension on sensor part.	
Enclosure rating (standard)	IP67 to EN 60529 (NEMA 4X), 1 mH <sub>2</sub> O for 30 min	IP67 to EN 60529 (NEMA 4X), 1 mH <sub>2</sub> O for 30 min
EMC	2004/108/EC	2004/108/EC

# SITRANS F M

# Flow sensor MAG 1100 and MAG 1100 HT

Version	MAG 1100	MAG 1100 HT (High temperature)
Design		
Weight	See Dimensional drawings	See Dimensional drawings
<u>Material</u>		
• Enclosure	Chairless shoul AICL 21CL /1 4404	Chairless shoul AICL 24CL /4 4404
- MAG 1100	Stainless steel AISI 316L/1.4404	Stainless steel AISI 316L/1.4404
<ul><li>Terminal box</li><li>Standard</li><li>Option</li></ul>	Fibre glass reinforced polyamide (not for Ex) Stainless steel AISI 316/1.4436	Stainless steel AISI 316/1.4436
• Fixing studs	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001
Gaskets		
- Standard - Option	EPDM (max. 150 °C, PN 40 (max. 302 °F, 600 psi))  • Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))  • PTFE (max. 130 °C, PN 25 (max. 266 °F, 300 psi))	Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))
<ul> <li>Pipe connection adapters: DN 2, 3, 6 and 10 (1/12", 1/8", 1/4" and 3/8")</li> </ul>	<ul><li>Stainless steel, AISI 316/1.4436</li><li>Hastelloy C22/2.4602</li><li>PVDF</li></ul>	
Liner		
MAG 1100 (Ceramic)	<ul> <li>DN 2, 3 (1/12", 1/8"): Zirconium oxide (ZrO<sub>2</sub>) (ceramic)</li> <li>DN 6 100 (¼" 4"): Aluminum oxide Al<sub>2</sub>O<sub>3</sub></li> </ul>	DN 15 100 ( $1/2$ " 4"): Aluminum oxide $Al_2O_3$
• MAG 1100 (PFA)	Reinforced PFA (not for Ex)	
Electrodes		
MAG 1100 (Ceramic)	<ul> <li>DN10 100 (3/6" 4") : Platinum with gold / Titanium brazing alloy</li> <li>DN 2 6 (1/12" 1/4"): Platinium</li> </ul>	Platinum with gold / Titanium brazing alloy
• MAG 1100 (PFA)	• DN 10 15 (3/8" ½"): Hastelloy C276/2.4819 • DN 25 100 (1" 4"): Hastelloy C22/2.4602	
Cable entries	Remote installation 2 x M20 or 2 x ½" NPT     Compact installation     MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT     MAG 6000 I: 2 x M25 (for supply/output)     MAG 6000 I Ex: 2 x M25 (for supply/output)	Remote installation 2 x M20 or 2 x ½" NPT
Certificates and approvals		
Calibration		
Standard production calibration (default), calibration report shipped with sensor	Zero-point, 2 x 25 %, 2 x 90 %	Zero-point, 2 x 25 %, 2 x 90 %
<ul> <li>Special calibration</li> </ul>	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of	
	factory $Q_{max}$ 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$	
	Matched-pair calibration: default, 5-point or 10-point	
Conforms to	<ul> <li>PED – 97/23/EC<sup>3)</sup> (Fluid group: Liquid of fluid group 1)</li> <li>CRN (PFA)</li> </ul>	<ul> <li>PED – 97/23/EC<sup>3)</sup></li> <li>CRN (PFA)</li> </ul>
Material certificate EN 10204-3.1	Available when ordering together with meter <sup>4)</sup>	Available when ordering together with meter <sup>4)</sup>
Ex approvals		
MAG 1100 (Ceramic)		
<ul> <li>Ex sensor or Compact with MAG 6000 I Ex</li> </ul>	ATEX 2G D sensor Ex de ia IIB T3 - T6	ATEX 2G D sensor Ex de ia IIB T3 - T6
- Sensor with/without MAG 5000/6000 /6000 I	FM Class I, Div 2	FM Class I, Div 2
• MAG 1100 (PFA)		
- Sensor with/without MAG 5000/6000/6000 I	FM Class I, Div 2	
Custody transfer approval (MAG 5000/6000 CT) <sup>2)</sup>	<ul> <li>Cold water pattern approval PTB (Germany)</li> <li>Hot water pattern approval PTB (Germany)</li> <li>Other media than water pattern approval- OIML R 117 (Ceramic liner) (Denmark)</li> </ul>	Hot water pattern approval PTB (Germany)

For technical specification for transmitter - see transmitter pages.

 $<sup>^{1)}</sup>$  Conditions are also dependent on liner characteristics  $^{2)}$  With compact transmitter MAG 5000 CT/6000 CT -20  $\dots$  +50 °C (-4  $\dots$  +122 °F)

<sup>3)</sup> For further information on the PED standard and requirements, see page 9/6.

<sup>&</sup>lt;sup>4)</sup> Has to be ordered with the meter. It is not possible to order the certificate afterwards.

### Flow sensor MAG 1100 and MAG 1100 HT

Selection and Ordering data		Α	rti	cl	е	No			
Sensor SITRANS F M MAG 1100		7	M	Ε	6	1 1	0		
EPDM gaskets included						0 -			
➢ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						•			
Diameter									
DN 2 (1/12")	1)	1	D						
DN 3 (1/8")	1)	1	Н						
DN 6 (1/4")	1)	1	M						
DN 10 (3/8") DN 15 (½")	•		R V						
DN 25 (1") DN 40 (1½") DN 50 (2")	• • •	2	D R Y						
DN 65 (2½") DN 80 (3") DN 100 (4")	• • •	3	F M T						
Liner material									
PFA - DN 10 100 (3/8" 4") (not for Ex) Ceramic	•				1				
Electrode material									
Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)	•						1 2		
Transmitter									
Standard sensor for remote transmitter (order transmitter separately)	•						,	A	
Ex sensor for remote transmitter							ı	В	
(order transmitter separately) MAG 6000 I, Aluminum 18 90 V DC, 115 230 V AC							(	С	
MAG 6000 I, Aluminum 18 30 V DC, Ex							ı	D	
MAG 6000 I, Aluminum 115 230 V AC, Ex							ı	Ε	
MAG 6000 Polyamide, 11 30 V DC/ 11 24 V AC	•						ı	Н	
MAG 6000, Polyamide, 115 230 V AC	•						١,	J	
MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC	•							K	
MAG 5000, Polyamide, 115 230 V AC	•						ı	L	
Communication									
No communication, add-on possible	•							A	L
HART	•							Е	
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)								F	
PROFIBUS DP Profile 3 (not for Ex)	•							G	,
(only MAG 6000/MAG 6000 I)									
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)								E	
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)								J	ı
Cable glands/terminal box									Ш
Metric: Polyamide terminal box or 6000 I compact	•								1
1/2" NPT: Polyamide terminal box or 6000 I compact	•								2
Metric: SS terminal box (mandatory for stainless steel MAG 6000 transmitter)									3
½" NPT: SS terminal box (mandatory for stainless steel MAG 6000 transmitter)									4

<ul> <li>We can offer shorter delivery times for configurations designat</li> </ul>	ed with
the Quick Ship Symbol ●. For details see page 9/5 in the app	endix.

<sup>1)</sup> Quick ship only in combination with Ceramic liner

Selection and Ordering data	Order code
Additional information	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special calibration	
<ul> <li>5-point calibration<sup>1)</sup></li> </ul>	D01
<ul> <li>10-point calibration<sup>2)</sup></li> </ul>	D06
<ul> <li>Default (2 x 25 % and 2 x 90 %) matched-pair calibration</li> </ul>	D11
<ul> <li>5-point, matched-pair calibration<sup>1)</sup></li> </ul>	D15
<ul> <li>10-point, matched-pair calibration<sup>2)</sup></li> </ul>	D18
Customer-specific converter setup	Y20
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex sensors)	Y41
Other postproduction requirements (add desired text)	Y99
Additional calibrations	
<ul> <li>Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)</li> </ul>	On request <sup>3)</sup>
<ul> <li>Customer-specified calibration up to 10 points</li> </ul>	On request <sup>3)</sup>
<ul> <li>Customer-witnessed calibration Any of above calibration</li> </ul>	On request <sup>3)</sup>

 $<sup>^{1)}</sup>$  20 %, 40 %, 60 %, 80 %, 100 % of factory  $Q_{\mbox{\scriptsize max}}$ 

#### Operating instructions for SITRANS F M MAG 1100

Description	Article No.	
Handbook		
• English	A5E02435647	

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\mbox{\sf F}$  literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description		Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	•	FDK:085U0220	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

 $<sup>^{2)}</sup>$  Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory  $\rm Q_{max}$ 

<sup>3)</sup> Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://www.automation.siemens.com/mcms/automation/en/sensor-systems/process-instrumentation/Pages/Default.aspx and send together with the order. (Size dependent restriction on maximum flow rates may apply

#### SITRANS F M

#### Flow sensor MAG 1100 and MAG 1100 HT

Selection and Ordering data	Article No.	
Sensor SITRANS F M		
MAG 1100 HT High Temperature	7 M E 6 1 2 0 -	
Ceramic liner, Platinum electrode, Graphite gaskets included	A 2 0 - 2	A
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Diameter		
DN 15 (½")	1 V	
DN 25 (1")	2 D	
DN 40 (1½")	2 R	
DN 50 (2")	2 Y	
DN 80 (3")	3 M	
DN 100 (4")	3 T	
Transmitter		
Standard sensor for remote transmitter (order transmitter separately)	А	
Ex sensor for remote transmitter (order transmitter separately)	В	
Cable glands/terminal box		
Metric: SS terminal box		3
½" NPT: SS terminal box		4

72 NPT: 55 terminal box	4
Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special calibration	
<ul> <li>5-point calibration<sup>1)</sup></li> </ul>	D01
• 10-point calibration <sup>2)</sup>	D06
$\bullet$ Default (2 x 25 % and 2 x 90 %) matched-pair calibration	- D11
• 5-point, matched-pair calibration <sup>1)</sup>	D15
• 10-point, matched-pair calibration <sup>2)</sup>	D18
Customer-specific converter setup	Y20
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex sensors)	Y41
Other postproduction requirements (add desired text)	Y99
Additional calibrations	
Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request <sup>3)</sup>
Customer-specified calibration up to 10 points	On request <sup>3)</sup>
Customer-witnessed calibration	On request <sup>3)</sup>

 $<sup>^{1)}</sup>$  20 %, 40 %, 60 %, 80 %, 100 % of factory  $Q_{\mbox{\scriptsize max}}$ 

Any of above calibration

#### Operating instructions for SITRANS F M MAG 1100

Description	Article No.	
Handbook		
• English	A5E02435647	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I Ex ATEX 2G D transmitters and sensors are delivered compact mounted from factory. Communication module will be premounted in the transmitter.

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

#### Accessories

Description		Article No.	
Potting kit for terminal box of flow sensors for IP68/ NEMA 6P	•	FDK:085U0220	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

 $<sup>^{2)}</sup>$  Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory  $\rm Q_{max}$ 

<sup>3)</sup> Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply

### Flow sensor MAG 1100 and MAG 1100 HT

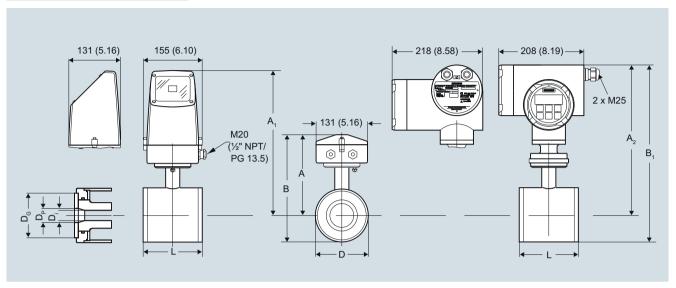
Accessories for MAG 1100 sensor	Article No.	Accessories for MAG 1100 sensor	Article No.
Pipe connection ½" external thread		Grounding ring SS	
For DN 2 10 (1/12" 3/8") sensor, material: SS 316 2 pipe connections, 2 EPDM gaskets, 12 pcs M4 x 12 screws	- FDV 0000000	Material: AISI 316/1.4436; each set includes: 1 grounding ring <sup>1)</sup> , 3 PTFE gaskets, 1 earth wire, 1 M6 screw • DN 2 10 (1/12" 3/8")	FDK:083G0686
<ul><li>½" G, ISO 7-1 tappered thread, SS 316</li><li>½" NPT thread, SS 316</li></ul>	<ul><li>FDK:083G0080</li><li>FDK:083G4330</li></ul>	( )	FDK:083G0687 FDK:083G0689
For DN 2 10 (1/12" 3/8") sensor, material: Hastelloy C 2 pipe connections, 2 PTFE gaskets, 12 pcs M4 x 14 screws		• DN 40 (1½") • DN 50 (2") • DN 65 (2½")	FDK:083G0691 FDK:083G0692 FDK:083G0693
• ½" G, ISO 7-1 tappered thread • ½" NPT thread	<ul><li>FDK:083G4332</li><li>FDK:083G4331</li></ul>	• DN 80 (3") • DN 100 (4")	FDK:083G0694 FDK:083G0695
For DN 210 (1/12"3/8") sensor 2 PVDF pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 grounding ring 1, 1 earthing wire, 3 PTFE gaskets, 2 space rings, 6 pcs. M4 x 12 and 6 pcs. M4 x 20 screws  • ½"G, ISO 7-1 tapered thread PVDF incl. grounding ring Hastelloy C22/2.4602  • ½" NPT thread PVDF incl. grounding ring Hastelloy C22/2.4602	A5E01018395 A5E01018400	• DN 15 (½") • DN 25 (1") • DN 40 (1½")	FDK:083G3259 FDK:083G3261
EPDM gaskets		• DN 50 (2")	
Material: EPDM; each set includes: 2 EPDM gaskets, 1 earthing wire, 1 M6 screw, 1 nut, 1 washer, 1 bolt earthing plate  • DN 2 10 (1/12" 3/8")	● FDK:083G3116	• DN 65 (2½") • DN 80 (3") • DN 100 (4")  Grounding ring (Tantalum)	FDK:083G3263 FDK:083G3264 FDK:083G3265
<ul> <li>DN 15 (½")</li> <li>DN 25 (1")</li> <li>DN 40 (1½")</li> <li>DN 50 (2")</li> <li>DN 65 (2½")</li> <li>DN 80 (3")</li> <li>DN 100 (4")</li> </ul>	FDK:083G3117 FDK:083G3119 FDK:083G3121 FDK:083G3122 FDK:083G3123 FDK:083G3124 FDK:083G3124	Material: Tantalum; each set includes: 1 grounding ring <sup>1)</sup> , 3 PTFE gaskets, 1 earth wire, 1 M6 screw • DN 2 10 (1/12" 3/8") • DN 15 (½") • DN 25 (1") • DN 40 (1½")	A5E01181599 A5E01181606 A5E01181610 A5E01181613
• DN 100 (4")	● FDK:083G3125	• DN 50 (2")	A5E01181615
PTFE gaskets  Material: PTFE; each set includes: 2 gaskets, 2 earthing wires, 3 M6 screws (DN 2 DN 10: 12 pcs M4 x 14)		• DN 65 (2½") • DN 80 (3")	A5E01181616 A5E01181619
• DN 2 10 (1/12" 3/8")	● FDK:083G0156	• DN 100 (4")	A5E01181622
• DN 15 (½") • DN 25 (1")	● FDK:083G0157 ● FDK:083G0159	Studs and nuts for DN 100 PN 25/40, 8 M20 studs, 16 M20 nuts	
• DN 40 (1½") • DN 50 (2")	<ul><li>FDK:083G0161</li><li>FDK:083G0162</li><li>FDK:083G0163</li></ul>	Material: AISI 304/1.4305 • DN 100 (4")	FDK:083G0226
• DN 65 (2½") • DN 80 (3")	► FDK:083G0164	1) Thickness of grounding ring is 2 mm (0.08 inch)	
• DN 100 (4")	● FDK:083G0165	<ul> <li>We can offer shorter delivery times for configuenthe Quick Ship Symbol</li> <li>For details see page</li> </ul>	
Graphite gaskets  Material: Graphite; conductive, each set includes: 2 gaskets (conductive (can also be used as grounding ring))  • DN 2 10 (1/12" 3/8")  • DN 15 (½")  • DN 25 (1")  • DN 40 (1½")  • DN 50 (2")	<ul> <li>FDK:083G0116</li> <li>FDK:083G0117</li> <li>FDK:083G0119</li> <li>FDK:083G0121</li> <li>FDK:083G0122</li> </ul>	tilo dalok oli ip oyi iboli = 1 i oli dotalo odo pag	10 0,0 III tile appor
• DN 65 (2½") • DN 80 (3")	<ul><li>FDK:083G0123</li><li>FDK:083G0124</li></ul>		
200 (0 /	● FDK:083G0124		

SITRANS F M

### Flow sensor MAG 1100 and MAG 1100 HT

### Dimensional drawings

Sensor MAG 1100, compact/remote



Dimensions in mm (inch)

### Important note: For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part

Size DN	A <sup>1)</sup> [mm]	B <sup>1)</sup> [mm]	A <sub>1</sub> /A <sub>2</sub> <sup>3)</sup> [mm]	B <sub>1</sub> [mm]	D [mm]	D <sub>i</sub> [mm]	D <sub>i</sub> (PFA) [mm]	D <sub>P</sub> [mm]	D <sub>G</sub> [mm]	Weight <sup>2)</sup> [kg]
2	161	186	315	340	48.7	2		17.3	34	2.2
3	161	186	315	340	48.7	3		17.3	34	2.2
6	161	186	315	340	48.7	6		17.3	34	2.2
10	161	186	315	340	48.7	10	10	13.6	34	2.2
15	161	186	315	340	48.7	15	16	17.3	40	2.2
25	169	201	323	354	63.5	25	26	28.5	56	2.7
40	179	221	333	375	84.0	40	38	43.4	75	3.4
50	188	239	342	393	101.6	50	50	54.5	90	4.2
65	198	258	351	412	120.9	65	66	68.0	112	5.5
80	204	270	357	424	133.0	80	81	82.5	124	7.0
100	217	296	370	450	159.0	100	100	107.1	150	10.0

Size [inch]	A <sup>1)</sup> [inch]	B <sup>1)</sup> [inch]	A <sub>1</sub> /A <sub>2</sub> <sup>3)</sup> [inch]	B <sub>1</sub> [inch]	D [inch]	D <sub>i</sub> [inch]	D <sub>i</sub> (PFA) [inch]	D <sub>P</sub> [inch]	D <sub>G</sub> [inch]	Weight <sup>2)</sup> [lb]
1/12	6.34	7.33	12.40	13.39	1.92	0.08		0.68	1.34	4.8
1/8	6.34	7.33	12.40	13.39	1.92	0.12		0.68	1.34	4.8
1/4	6.34	7.33	12.40	13.39	1.92	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.40	13.39	1.92	0.39	0.39	0.53	1.34	4.8
1/2	6.34	7.33	12.40	13.39	1.92	0.59	0.63	0.68	1.57	4.8
1	6.66	7.92	12.72	13.94	2.50	0.98	1.02	1.12	2.20	4.9
11/2	7.05	8.70	13.11	14.76	3.31	1.57	1.50	1.71	2.95	7.5
2	7.40	9.41	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
21/2	7.80	10.16	13.82	16.22	4.76	2.56	2.60	2.68	4.41	12
3	8.03	10.63	14.06	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.54	11.65	14.57	17.72	6.26	3.94	3.94	4.22	5.91	22

<sup>1) 14.5</sup> mm/0.571" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (392 °F) version)

With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb). With MAG 6000 I weight is increased with 5.5 kg (12.1 lb).
 A<sub>2</sub> is 3 mm (0.12") shorter than A<sub>1</sub>

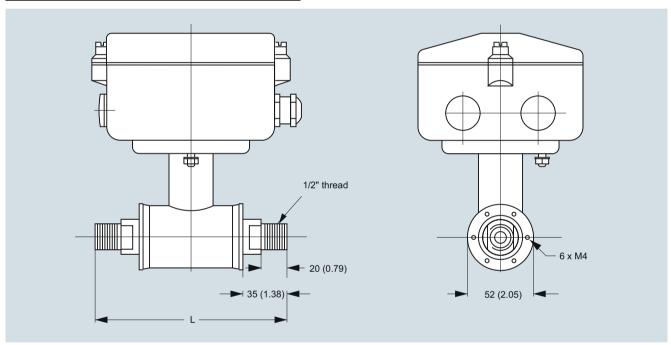
### Flow sensor MAG 1100 and MAG 1100 HT

The total build-in length "L" [mm]/[inch] before assembling depends on the gasket selected

Size		EPDM		Graphite		PTFE (Tef	lon)	Without ga	sket	Earthing ri	ng
DN	inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
2 10 <sup>1)</sup>	1/12 3/8	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	1/2	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	11/2	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	21/2	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

<sup>1)</sup> Mounting between two flanges

### Sensor MAG 1100 DN 2 ... 10 (1/12" ... 3/8") with adapters



The MAG 1100 DN 2, 3, 6 and 10 (1/12", 1/8",  $\frac{1}{4}$ " and 3/8") are prepared for assembly with the  $\frac{1}{2}$ " pipe connections. Dimensions in mm (inch) The length "L" varies dependent on the gasket choice.

Stainless ste	Stainless steel and Hastelloy pipe connections								nnections
Without gask	Without gasket EPDM Graphite PTFE				PTFE				
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm] [inch]		[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1	133	5.2

### Important note:

For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.

SITRANS F M

### Flow sensor MAG 1100 F

#### Overview



The electromagnetic sensor SITRANS F M MAG 1100 F is designed to meet applications in the food and beverage industry.

#### Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval and EHEDG certified
- · Sanitary design for CIP / SIP cleaning
- · Conforms to FDA
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

#### Application

The main applications of the SITRANS F M electromagnetic sensors can be found in the following fields:

- · Food industry
- · Beverage industry
- Pharmaceutical industry

### Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy "plug & play" field changeable
- Simple on site upgrade to IP68/NEMA 6P terminal box
- Ex ATEX 2G D version for hazardous areas (ceramic liner)

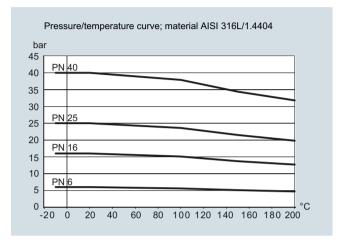
### Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

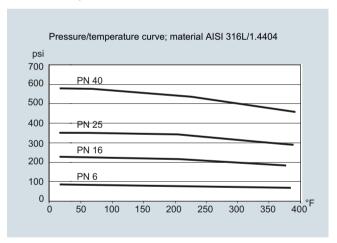
### Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS F M MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, Modbus RTU/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

#### Pressure/temperature curve; material AISI 316L/1.4404



#### Pressure/temperature curve; material AISI 316L/1.4404



For further information on the PED standard and requirements, see page 9/6.

### Flow sensor MAG 1100 F

Technical specifications			
Measuring principle	Electromagnetic induction	Design	
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 10 65 (¼" 2½"): 12.5 Hz/15 Hz	Weight	See Dimensional drawings
(Mains supply: 50 Hz/60 Hz)	DN 80 100 (3", 4"):	<u>Material</u>	
	6.25 Hz/7.5 Hz	Enclosure	
Process connection Nominal size	DN 10 DN 100 (2/9" 4")	• MAG 1100 F	Stainless steel AISI 316L/1.4404
Process connection	DN 10 DN 100 (3/8" 4") Hygienic adapters available for:	Terminal box (remote version only)	
	Direct welding onto pipe	• Standard	Fibre glass reinforced polyamide
	<ul><li>Clamp fitting</li><li>Threaded fitting</li></ul>	• Option	Stainless steel AISI 316/1.4436
Rated operating conditions		• Ex ATEX (remote version only)	Stainless steel AISI 316/1.4436
Ambient conditions		Liner	
Ambient temperature <sup>1)</sup>	100.00 / 100.05	MAG 1100 F (Ceramic)	Aluminum oxide Al <sub>2</sub> O <sub>3</sub> (ceramics)
<ul><li>Sensor</li><li>Ex sensor</li></ul>	-40 +100 °C (-40 +212 °F) -20 +60 °C (-4 +140 °F)	MAG 1100 F (PFA)	Reinforced PFA (teflon)
Compact transmitter	-20 +60 °C (-4 +140 °F)		(not for Ex)
MAG 5000/6000 <sup>2)</sup>	, ,	Electrodes	
Transmitter MAG 6000 I     Compact transmitter	-20 +60 °C (-4 +140 °F) -20 +60 °C (-4 +140 °F)	MAG 1100 F (Ceramic)	Platinum with gold /Titanium brazing alloy
MAG 6000 I Ex		MAG 1100 F (PFA)	• DN 10 15 (3/8" ½"):
Temperature of medium			Hastelloy C276/2.4819 • DN 25 100 (1" 4"):
MAG 1100 F (Ceramic)	-20 +150 °C (-4 +302 °F) Suitable for steam sterilization		Hastelloy C22/2.4602
MAG 1100 F (PFA)	-30 +130 °C (-22 +266 °F) Suitable for steam steralization at 150 °C (302 °F)	Cable entries	<ul> <li>Remote installation 2 x M20 or 2 x ½" NPT</li> <li>Compact installation</li> <li>MAG 5000/MAG 6000: 4 x M20</li> </ul>
Temperature shock			or 4 x ½" NPT - MAG 6000 I: 2 x M25 (for sup-
MAG 1100 F			ply/output)
<ul> <li>Duration ≤ 1 min, followed by 10 min rest</li> </ul>	• DN 10, 15, 25: Max. ΔT ≤ 80 °C/min (3/8", ½", 1":		- MAG 6000 I Ex: 2 x M25 (for supply/output)
	Max. ΔT ≤ 144 °F/min)	Certificates and approvals	
	<ul> <li>DN 40, 50, 65:</li> <li>Max. ΔT ≤ 70 °C/min</li> </ul>	Calibration	
	(1½", 2", 2½": Max. ΔT ≤ 126 °F/min) • DN 80, 100:	<ul> <li>Standard Production calibration, calibration report shipped with sen- sor</li> </ul>	Zero-point, 2 x 25 %, 2 x 90 %
MAG 1100 F (PFA)	Max. $\Delta T \le 60$ °C/min (3", 4": Max. $\Delta T \le 108$ °F/min) Max. $\pm 100$ °C (212 °F) momentarily	MAG 1100 F (Ceramic)	3A (sensor with Polyamide termi- nal box and FKM/FPM or EPDM gaskets), transmitter not part of the approval
Operating pressure	,	Ex ATEX approvals for sensor or	ATEX 2G D sensor EEx d e ia IIB
MAG 1100 F (Ceramic)	DN 10 65: 40 bar (3/8" 21/2":	compact with MAG 6000 I Ex  • Sensor with/without	T3 - T6 FM Class I, Div 2
	580 psi) DN 80: 25 bar (3": 363 psi)	MAG 5000/6000/6000 I	1 W Glace I, BIV 2
	DN 100: 25 bar (4": 363 psi) Vacuum: 1 x 10 <sup>-6</sup> bar <sub>abs</sub>	MAG 1100 F (PFA)	3A (sensor with Polyamide terminal box with EPDM gasket), trans-
	(1.5 x 10 <sup>-5</sup> psi <sub>abs</sub> )		mitter not part of the approval
MAG 1100 F (PFA)	20 bar (290 psi)		EHEDG certified (use EPDM gasket)
	Vacuum: 0.02 bar <sub>abs</sub> (0.3 psi <sub>abs</sub> )		(DN 25 100 (1 4"))
	DN 80 DN 100: CO <sub>2</sub> pressure max. 7 bar (101.5 psi)		FM Class I, Div 2
Mechanical load (vibration)	18 1000 Hz random in x, y z, directions for 2 hours according to		Hygienic EC 1925:2003 European food contact material
	EN 60068-2-36 Sensor: 3.17 g RMS	Material certificate EN 10204 3.1	Available when ordering together with meter <sup>3)</sup>
	Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS.	Conforms to	• PED – 97/23/EC <sup>4)</sup> • CRN (PFA)
	Sensor with compact MAG 6000 I/MAG 6000 I Ex	Custody transfer ======	FDA     Cold water nettern engroval DTD
	mounted transmitter: 1.14 g RMS	Custody transfer approvals (MAG 5000/6000 CT)	<ul> <li>Cold water pattern approval PTB (Germany)</li> </ul>
	For compact installation with the MAG 6000 I/MAG 6000 I Ex, trans-		Hot water pattern approval PTB     (Cormon)
	mitter to be supported to avoid		<ul><li>(Germany)</li><li>Other media than water pattern</li></ul>
Enclosure rating	tension on sensor part. IP67 to EN 60529 (NEMA 4X),		approval- OIML R 117 (Ceramic liner)(Denmark)
<u></u>	1 mH <sub>2</sub> O for 30 min	Conditions are also dependent on I	,,
E1.10	0004/400/50	U Conditions are also dependent on I	iner characteristics

EMC

2004/108/EC

<sup>1)</sup> Conditions are also dependent on liner characteristics.

<sup>2)</sup> With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F)

<sup>3)</sup> Has to be ordered with the meter. It is not possible to order the certificate afterwards.

For further information on the PED standard and requirements, see page 9/6.

### SITRANS F M

### Flow sensor MAG 1100 F

Accessories	
Weld-in adapter	
Adapter for welding onto dairy pipe	Tri-Weld, ISO 2037, DIN 11850, SMS 3008, BS 4825-1
• DN 10, 15, 25, 40, 50 and 65 (3/8", ½", 1", 1½", 2"and 2½")	PN 40 (600 psi)
• DN 80 and DN 100 (3" and 4")	PN 25 (350 psi)
Clamp adapter	Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3
DN 10, 15, 25, 40 and 50 (3/8", ½", 1", 1½", and 2")	PN 16 (200 psi)
DN 65, 80 and 100 (2½", 3" and 4")	PN 10 (150 psi)
Thread adapter	
DIN 11851	
• DN 10, 15, 25, and 40 (3/8", ½", 1", and 1½")	PN 40 (600 psi)
• DN 50, 65, 80 and 100 (2", 2½", 3" and 4")	PN 25 (350 psi)
ISO 2853, BS 4825-4	
• DN 10, 15, 25, 40, 50, 65 and 80 (3/8", ½", 1", 1½", 2", 2½ and 3")	PN 16 (200 psi)
SMS 1145	
• DN 25, 40, 50, 65 and 80 (1", 1½", 2", 2½" and 3")	PN 6 (80 psi)
Design	
Material	
Adapter	Stainless steel AISI 316/1.4436
Gasket	
MAG 1100 F (Ceramic)	FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 +150 °C (-4 +302 °F))
	EPDM (-20 +150 °C (-4 +302 °F))
• MAG 1100 F (PFA)	EPDM (-20 +150 °C (-4 +302 °F))
	NBR (-20 +100 °C (-4 +212 °F))

### Note:

When combined sensor and adapter, the operating pressure is the lower rated of the pair.

Selection and Ordering data			
A Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	Selection and Ordering data		Article No.
Page   Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	Sensor SITRANS F M MAG 1100 F		7 M E 6 1 4 0 -
Diameter   Diameter   Din 10 (3/8")			
DN 10 (3/8") DN 15 (½") DN 15 (½") DN 25 (1") DN 40 (1½") DN 50 (2") DN 50 (2") DN 60 (2") DN 60 (2") DN 80 (3") DN 80 (3") DN 100 (4")  Process connections No adaptors (specials see accessories) Weld in DIN 11950 BS 4825-1 DIN 11950 BS 4825-1 DIN 138676 GC BS 4825-1 DIN 138676 GG BS 4825-3 Tri-Clamp Cheraded type DIN 1351 MN N Liner material PFA (not for Ex) Ceramic  Gasket material PFA (not for Ex) Ceramic  Gasket (FDA, 3A) Elped filed, 3A) Elped filed, 3A) Eliner material Hastelloy C (only with PFA liner) PPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A AC x sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC			
DN 15 (½") DN 25 (1") DN 26 (1") DN 20 (1½") DN 30 (2") DN 30 (2") DN 30 (2") DN 30 (3") DN 100 (4")  Process connections No adaptors (specials see accessories) Weld in DIN 11850 BS (2825-1 Tri-Weld Clamp type DIN 32676 SD 2852 (SMS 3016) BS 4825-1 Tri-Clamp DIN 11851 SMS 1145-1)  Liner material PFA (not for Ex) Ceramic Gasket material <sup>1)</sup> EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately), 3A MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 18 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 5000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000	Diameter		
DN 25 (1") DN 40 (11½") DN 40 (11½") DN 50 (2") DN 80 (2") DN 80 (3") DN 100 (4") DN 100 (5") DN 100 (	` '		
DN 40 (11½")			
DN 50 (2") DN 65 (2½") DN 65 (2½") DN 80 (3") DN 100 (4")  Process connections No adaptors (specials see accessories)  Weld in DIN 11850 BS 29327 (SMS 3008) BS 4825-1 Tri-Weld Clamp type DIN 32676 GS 2852 (SMS 3016) BS 4825-3 Tri-Clamp K Threaded type DIN 11851 BM N Threaded type DIN 11851 BM N Threaded type DIN 11851 BM N N N Threaded type DIN 11851 BM N N Ceramic Casket material PFA (not for Ex) Ceramic DPDM/FKM (FDA, 3A) (only with ceramic liner) 2 Telectrode material Hastelloy C (only with PFA) (iFDA, EHEDG certified, 3A) Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner) Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor for remote transmitter (order transmitter separately), 3A Cx Sensor			
DN 80 (3")			
DN 100 (4")	DN 65 (2½")		3 F
No adaptors (specials see accessories)	• •		
Weld in	Process connections		
DIN 11850	No adaptors (specials see accessories)	•	A
ISO 2037 (SMS 3008)	Weld in		
BS 4825-1 Tri-Weld Clamp type DIN 32676 ISO 2852 (SMS 3016) BS 4825-3 Tri-Clamp Threaded type DIN 11851 SMS 1145 <sup>1)</sup> Liner material PFA (not for Ex) Ceramic Casket material <sup>1)</sup> EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  2  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 115 230 V AC MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 5000, Polyamide, 115 230 V AC MAG 5000, Polyamide, 115 230 V AC Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	DIN 11850	•	В
Tri-Weld	,		
Clamp type			
DIN 32676   ISO 2852 (SMS 3016)   BS 4825-3   J Tri-Clamp   K   K   Tri-Clamp   K   K   Tri-Clamp   K   K   Tri-Clamp   K   Tri-			
BS 4825-3 Tri-Clamp Threaded type DIN 11851 SMS 1145 <sup>1)</sup> Liner material PPA (not for Ex) Ceramic  Gasket material <sup>1)</sup> EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately), 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC MAG 6000 I, Aluminum 115 230 V AC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC/ MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART BPROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	DIN 32676		
Tri-Clamp Threaded type DIN 11851 SMS 1145 <sup>1)</sup> Liner material PFA (not for Ex) Ceramic  Gasket material <sup>1)</sup> EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu. 18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 115 230 V AC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC/ 11 24 V AC MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)			
Threaded type   DIN 11851			
DIN 11851   SMS 1145¹)	,	_	<u> </u>
Liner material PFA (not for Ex) Ceramic  Gasket material 1) EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  1 Platinum (only with ceramic liner)  7 Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 6000, Polyamide, 11 30 V DC/11 24 V AC MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC MAG 5000, Polyamide, 115 230 V AC MAG 5000, Polyamide, 115 230 V AC Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		•	М
PFA (not for Ex) Ceramic  Gasket material 1) EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC MAG 5000, Polyamide, 115 230 V AC MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	SMS 1145 <sup>1)</sup>	•	N
Gasket material¹¹         0           EPDM flat gasket (FDA, 3A)         0           FPM/FKM (FDA, 3A) (only with ceramic liner)         2           EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)         3           Electrode material         1           Hastelloy C (only with PFA liner)         1           Platinum (only with ceramic liner)         2           Transmitter         \$\frac{1}{2}\$ Standard sensor for remote transmitter (order transmitter separately), 3A         \$\frac{1}{2}\$ A sensor for remote transmitter (order transmitter separately) 3A           MAG 6000 I, Alu.18 90 V DC, 115 230 V AC         \$\frac{1}{2}\$ C           MAG 6000 I, Aluminum 18 30 V DC, Ex         \$\frac{1}{2}\$ D           MAG 6000, Polyamide, 11 30 V DC/ 11 24 V AC         \$\frac{1}{2}\$ H           MAG 5000, Polyamide, 115 230 V AC         \$\frac{1}{2}\$ C           MAG 5000, Polyamide, 115 230 V AC         \$\frac{1}{2}\$ K           MAG 5000, Polyamide, 115 230 V AC         \$\frac{1}{2}\$ K           Communication         \$\frac{1}{2}\$ No C           No communication, add-on possible         \$\frac{1}{2}\$ A           HART         \$\frac{1}{2}\$ B           PROFIBUS PA Profile 3 (not for Ex)         \$\frac{1}{2}\$ C           (only MAG 6000/MAG 6000 I)         \$\frac{1}{2}\$ C           MOS GOOO/MAG 6000 I) </td <td></td> <td></td> <td></td>			
Gasket material 1)  EPDM flat gasket (FDA, 3A)  FPM/FKM (FDA, 3A) (only with ceramic liner)  EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material  Hastelloy C (only with PFA liner)  Platinum (only with ceramic liner)  Transmitter  Standard sensor for remote transmitter (order transmitter separately), 3A  Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	· ·		
EPDM flat gasket (FDA, 3A) FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 115 230 V AC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 115 230 V AC  L  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		_	
FPM/FKM (FDA, 3A) (only with ceramic liner) EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)  Electrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 115 230 V AC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		•	0
Flectrode material Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter Standard sensor for remote transmitter (order transmitter separately), 3A Ex sensor for remote transmitter (order transmitter separately) 3A MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex MAG 6000 I, Aluminum 115 230 V AC, Ex MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	FPM/FKM (FDA, 3A) (only with ceramic liner)		2
Electrode material  Hastelloy C (only with PFA liner)  Platinum (only with ceramic liner)  Transmitter  Standard sensor for remote transmitter (order transmitter separately), 3A  Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)			3
Hastelloy C (only with PFA liner) Platinum (only with ceramic liner)  Transmitter  Standard sensor for remote transmitter (order transmitter separately), 3A  Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	·		
Transmitter         Standard sensor for remote transmitter (order transmitter separately), 3A           Ex sensor for remote transmitter (order transmitter separately) 3A         B           MAG 6000 I, Alu.18 90 V DC, 115 230 V AC         C           MAG 6000 I, Aluminum 18 30 V DC, Ex         D           MAG 6000 I, Aluminum 115 230 V AC, Ex         E           MAG 6000, Polyamide, 11 30 V DC/11 24 V AC         H           MAG 5000, Polyamide, 115 230 V AC         J           MAG 5000, Polyamide, 115 230 V AC         K           MAG 5000, Polyamide, 115 230 V AC         L           Communication         A           No communication, add-on possible         A           HART         B           PROFIBUS PA Profile 3 (not for Ex)         G           (only MAG 6000/MAG 6000 I)         G           PROFIBUS DP Profile 3 (not for Ex)         G           (only MAG 6000/MAG 6000 I)         G           Modbus RTU/RS 485 (not for Ex)         G           (only MAG 6000/MAG 6000 I)         F           FOUNDATION Fieldbus H1         J           (only MAG 6000/MAG 6000 I)         J		•	1
Standard sensor for remote transmitter (order transmitter separately), 3A  Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  C  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	Platinum (only with ceramic liner)		2
Standard sensor for remote transmitter (order transmitter separately), 3A  Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  C  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	Transmitter		
Ex sensor for remote transmitter (order transmitter separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  C  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	Standard sensor for remote transmitter (order		A
separately) 3A  MAG 6000 I, Alu.18 90 V DC, 115 230 V AC  MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)			R
MAG 6000 I, Aluminum 18 30 V DC, Ex  MAG 6000 I, Aluminum 115 230 V AC, Ex  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  B PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	separately) 3A		
MAG 6000 I, Aluminum 18 30 V DC, EX  MAG 6000 I, Aluminum 115 230 V AC, EX  MAG 6000, Polyamide, 11 30 V DC/11 24 V AC  MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/  11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	, , , , , , , , , , , , , , , , , , ,	_	
MAG 6000, Polyamide, 11 30 V DC/11 24 V AC		_	
MAG 6000, Polyamide, 115 230 V AC  MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC  MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)			
MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC MAG 5000, Polyamide, 115 230 V AC  Communication No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		_	
MAG 5000, Polyamide, 115 230 V AC  Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	MAG 5000, Polyamide, 11 30 V DC/	•	
Communication  No communication, add-on possible  HART  PROFIBUS PA Profile 3  (only MAG 6000/MAG 6000 I)  PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)			
No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		_	L
HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		•	A
(only MAG 6000/MAG 6000 I) PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	HART	•	В
PROFIBUS DP Profile 3 (not for Ex)  (only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex)  (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)			F
(only MAG 6000/MAG 6000 I)  Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)  J		•	G
(only MAG 6000/MAG 6000 I)  FOUNDATION Fieldbus H1  (only MAG 6000/MAG 6000 I)	· · ·		
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)			E
	FOUNDATION Fieldbus H1	•	J

<sup>1)</sup> SMS 1145 standard is not approved by 3A

Flow sensor MAG 1100 F

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 1100 F	7 M E 6 1 4 0 -
Cable glands/terminal box	
Metric: Polyamide terminal box or 6000 I compact •	1
1/2" NPT: Polyamide terminal box or 6000 I compact ●	2
Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	3
1/2" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	4

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

S	election and Ordering data	Order code
Α	dditional information	
	lease add "-Z" to Article No. and specify Order ode(s) and plain text.	
С	ustomer-specific converter setup	Y20
	ag name plate, stainless steel fixed with SS wire add plain text)	Y17
Ta	ag name plate, plastic (self adhesive)	Y18
Ν	laterial certificate according to EN 10204-3.1	C12
F	actory certificate according to EN 10204-2.2	C14
Fa	actory certificate according to EN 10204-2.1	C15
S	ensor cables wired (specify cable Article No.)	Y40
W	ensor for remote transmitter's junction box potted ith wired cable (specify cable Article No.) (not for Ex ensors)	Y41
0	ther postproduction requirements (add desired text)	Y99
Α	dditional calibrations	
	Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request <sup>1)</sup>
•	Customer-specified calibration up to 10 points	On request <sup>1)</sup>
	Customer-witnessed calibration Any of above calibration	On request <sup>1)</sup>

Ordering "On request" as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://intranet.automation.siemens.com/w1/automation-technology-flowmeasurement-18626.htm#content-19336&para1=Flow%20Measurement and send together with the order. (Size dependent restriction on maximum flow rates may apply

### Operating instructions for SITRANS F M MAG 1100F

, , , ,		_	_	
Description	A	Article No.		
Handbook				
<ul> <li>English</li> </ul>	,	A5E02435647		

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\mbox{\sf F}$  literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I Ex ATEX 2G D transmitters and sensors are delivered compact mounted from factory. Communication module will be pre-mounted in the transmitter

Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

#### Accessories

Description		Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	•	FDK:085U0220	The state of the s

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### SITRANS F M

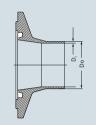
### Flow sensor MAG 1100 F

Accessories	Article No.
Weld-in connection fittings for MAG 1100 F with P gaskets for EHEDG	=

Only for sensors with PFA liner.

2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), P gaskets not included

<u>Adapter</u>			Sensor
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)



A5E02054630	•	10	1.5	13	10 <sup>2)</sup>
A5E02054633	•	15 <sup>3)</sup>	1.5	19	15 <sup>2)</sup>
A5E02054634		15	1.5	23	20
A5E02054635	•	25 <sup>3)</sup>	1.5	29	25
A5E02054637		25	1.5	35	32
A5E02054638	•	40	1.5	41	40
A5E02054640	•	50	1.5	53	50
A5E02054643		65	2.0	70	65
A5E02054644	•	80	2.0	85	80
A5E02054646	•	100	2.0	104	100

ISO 2037					
Adapter			Sensor		
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)		
12.7	12.7	1.0	10	•	A5E03727946
17.2	17.2	1.0	15	•	A5E03728098
25	25	1.6	25 <sup>3)</sup>		A5E02196073
33	33.7	1.6	25		A5E02196074
38	38	1.6	40 <sup>3)</sup>	•	A5E02196075
40	40	1.6	40		A5E02196076
51	51	1.6	50	•	A5E02196077
63.5	63.5	1.6	65	•	A5E02196078
76.1	76.1	1.6	80	•	A5E02196080
101.6	101.6	2.0	100		A5E02196082
Tri-Weld (					

•		,		
Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
12.7	12.7	1.2	10	A5E02199113
19.05	19.05	1.2	15	A5E02199114
25.4	25.4	1.6	25	A5E02199115
38.1	38.1	1.6	40	A5E02199116
50.8	50.8	1.6	50	A5E02199117
63.5 <sup>1)</sup>	63.5	1.6	65	A5E02199118
76.2	76.2	1.6	80	A5E02199119
101.6 <sup>1)</sup>	101.6	2.0	100	A5E02199120

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

D<sub>o</sub>: Outer diameter

D<sub>i</sub>: Inner diameter

1) For BS 4825-1 see ISO 2037

2) Not EHEDG approved

3) Default delivery

### Accessories

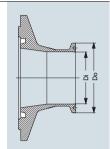
# Clamp-type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), P gaskets not included

DIN	3267	
-----	------	--

Adapter			Sensor
DN	D <sub>o</sub>	D <sub>i</sub>	DN
(mm)	(mm)	(mm)	(mm)



Article No.

10	34	10	10	A5E02211143
15	34	16	15	A5E02211144
25	50.5	22.6	25	A5E02211146
40	50.5	38	40	A5E02211147
50	64	50	50	A5E02211148
65	91	66	65	A5E02211151
80	106	81	80	A5E02211152
100	119	100	100	A5E02211153

IS	0	2852

Adapter DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	Sensor DN (mm)	
25	50.5	22.6	25 <sup>1)</sup>	A5E02213581
33.7	50.5	31.3	25	A5E02213582
38	50.5	35.6	40	A5E02213583
51	64	48.6	50	A5E02213584
63.5	77.5	60.3	65	A5E02213585
76.1	91	72.9	80	A5E02213586
101.6	119	97.6	100	A5E02213587

### Tri-Clamp (BS 4825-3)

Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	DN (mm)	
12.7	25.4	9.5	10	A5E02213596
19.05	25.4	15.85	15	A5E02213597
25.4	50.5	22.2	25	A5E02213598
38.1	50.5	34.9	40	A5E02213599
50.8	64	47.6	50	A5E02213600
63.5	77.5	60.3	65	A5E02213601
76.2	91	73	80	A5E02213602
101.6	119	97.6	100	A5E02213603

D<sub>o</sub>: Outer diameter

D<sub>i</sub>: Inner diameter

1) Default delivery

Article No.

### Flow Measurement SITRANS F M

### Flow sensor MAG 1100 F

### Accessories Threaded type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings

2 pcs. clamps (to join flow sensor and fitting), P gaskets not included

### DIN 11851

Adapter DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	Sensor DN (mm)	
10 15 20	28 34 44	10 16 20	10 15 <sup>2)</sup> 15	A5E02218293 A5E02218294 A5E02218295
25 32 40	52 58 65	26 32 38	25 <sup>2)</sup> • 25 40 •	A5E02218296 A5E02218297 A5E02218298
50 65 80	78 95 110	50 66 81	50 • 65 80	A5E02218299 A5E02218300 A5E02218301
100	130	100	100	A5E02218302

### Accessories

Article No.

# Threaded type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings

2 pcs. clamps (to join flow sensor and fitting), P gaskets not included

### SMS 1145<sup>1)</sup>

Adapter DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	Sensor DN (mm)	
25	40	22.6	25	A5E02218310
20	60	25.6	40	A E E 0 2 2 1 0 2 1 2

A5E02218310	25	22.6	40	25
A5E02218312	40	35.6	60	38
A5E02218313	50	48.6	70	51
A5E02218314	65	60.3	85	63.5
A5E02218315	65 <sup>2)</sup>	72	98	76

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

D<sub>o</sub>: Outer diameter

D<sub>i</sub>: Inner diameter

<sup>1)</sup> SMS 1145 standard is not approved by 3A

<sup>2)</sup> Default delivery

### SITRANS F M

### Flow sensor MAG 1100 F

Accesso	ries	Article No.				
	Weld in connection fittings for MAG 1100 F with flat gaskets for 3A					
For senso	For sensors with ceramic and PFA liner.					
2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included						
DIN 1185	0	Ø				
Adapter	Sensor	r				

DIN 11850	)			
Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
				a a

10	13	1.5	10	<b>●</b> F	DK:083G2116
15	19	1.5	15 <sup>2)</sup>		DK:083G2117
20	23	1.5	15	• F	DK:083G2118
25	29	1.5	25 <sup>2)</sup>	• F	DK:083G2119
32	35	1.5	25		DK:083G2120
40	41	1.5	40	• F	DK:083G2121
50	53	1.5	50	• F	DK:083G2122
65	70	2.0	65	• F	DK:083G2123
80	85	2.0	80	• F	DK:083G2124
100	104	2.0	100	• F	DK:083G2125

ISO 2037				
Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
12.7	12.7	1.0	10	A5E03720273
17.2	17.2	1.0	15	FDK:083G2107
25	25.6	1.6	25 <sup>2)</sup>	FDK:083G2109
33.7	33.7	1.6	25	FDK:083G2100
38	38	1.6	40 <sup>2)</sup>	FDK:083G2111
40	40	1.6	40	FDK:083G2101
51	51	1.6	50	FDK:083G2112
63.5	63.5	1.6	65	FDK:083G2113
76.1	71.1	1.6	80	FDK:083G2114
101.6	101.6	2.0	100	FDK:083G2115
114.3	118.3	2.0	100	FDK:083G2105
Tri-Weld	(BS 4825-1	1		

Tri-Weld (				
Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
12.7	12.7	1.2	10	FDK:083G2276
19.05	19.05	1.2	15	FDK:083G2277
25.4	25.4	1.6	25	FDK:083G2279
38	38.1	1.6	40	FDK:083G2281
50.8	50.8	1.6	50	FDK:083G2282
63.5 <sup>1)</sup>	63.5	1.6	65	FDK:083G2283
76.2	76.2	1.6	80	FDK:083G2284
101.6 <sup>1)</sup>	101.6	2.0	100	FDK:083G2285

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### Accessories

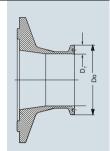
### Article No. Clamp-type connection fittings for MAG 1100 F with flat gaskets for 3A

For sensors with ceramic and PFA liner.

2 pcs. fittings 2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

n	IN	

Adapter			Sensor
DN	D <sub>o</sub>	D <sub>T</sub>	DN
(mm)	(mm)	(mm)	(mm)



10	34	10	10	FDK:083G2186
15	34	16	15	FDK:083G2187
25	50.5	26	25	FDK:083G2179
40	50.5	38	40	FDK:083G2181
50	64	50	50	FDK:083G2182
65	91	66	65	FDK:083G2183
80	106	81	80	FDK:083G2184
100	119	100	100	FDK:083G2185

ISO	2852

Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
25	50.5	22.6	25 <sup>1)</sup>	FDK:083G2189
33.7	50.5	31.3	25	FDK:083G2190
38	50.5	35.6	40	FDK:083G2191
51	64	48.6	50	FDK:083G2192
63.5	77.5	60.3	65	FDK:083G2193
76.1	91	72.9	80	FDK:083G2194
101.6	119	97.6	100	FDK:083G2195

### Tri-Clamp (BS 4825-3)

Adapter			Sensor	
DN (mm)	D <sub>o</sub> (mm)	D <sub>T</sub> (mm)	DN (mm)	
12.7	25.4	9.5	10	FDK:083G2286
19.05	25.4	15.85	15	FDK:083G2287
25.4	50.5	22.2	25	FDK:083G2289
38.1	50.5	34.9	40	FDK:083G2291
50.8	64	47.6	50	FDK:083G2292
63.5	77.5	60.3	65	FDK:083G2293
76.2	91	73	80	FDK:083G2294
101.6	119	97.6	100	FDK:083G2295

Do: Outer diameter

D<sub>i</sub>: Inner diameter

D<sub>o</sub>: Outer diameter

D<sub>i</sub>: Inner diameter

<sup>1)</sup> For BS 4825-1 see ISO 2037

<sup>2)</sup> Default delivery

<sup>1)</sup> Default delivery

### Flow sensor MAG 1100 F

Accessories					Article No.
Threaded	type conne	ection fittin	gs for		7.1.110.10 1.10.
	F with flat	•			
	s with cera	mic and PF	A liner.		
2 pcs. fittir 2 pcs. clar		flow sensor	r and fitting),		
flat gasket	s not includ	ed			
DIN 11851					<b>1</b> 20
Adapter			Sensor		
DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	DN (mm)		
					ia å
10	28	10	10		FDK:083G2156
15 20	34 44	16 20	15 <sup>2)</sup> 15		FDK:083G2157 FDK:083G2158
			25 <sup>2)</sup>		
25 32	52 58	26 32	25 <sup>-7</sup> 25		FDK:083G2159 FDK:083G2160
40	65	38	40	•	FDK:083G2161
50	78	50	50	•	FDK:083G2162
65	95	66	65		FDK:083G2163
80	110	81	80		FDK:083G2164
100	130	100	100		FDK:083G2165
ISO 2853					
<u>Adapter</u>			Sensor		
DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	DN (mm)		
					-   <del> </del>   <del> </del>
25	37	22.6	25		FDK:083G2149
38 51	51 64	35.6 48.6	40 50		FDK:083G2151 FDK:083G2152
63.5	78	60.3	65		FDK:083G2152
76.1	76 91	72.9	80		FDK:083G2154
BS 4825-4		-	-		
Adapter			Sensor		
DN (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (mm)	DN (mm)		
25.4	37	22.2	25		A5E03732429
38.1	51	34.9	40		A5E03732431
50.8	64	47.6	50		A5E03732433
63.5	78	60.3	65		A5E03732434
76.2	91	73	80		A5E03732435
101.6	126	97.6	100		FDK:083G2145

# Accessories Article No. Threaded type connection fittings for MAG 1100 F with flat gaskets for 3A

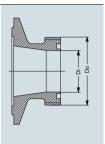
For sensors with ceramic and PFA liner.

2 pcs. fittings

2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

SMS	11	45	1,
-----	----	----	----

Adapter			Sensor
DN (mm)	$D_0$ (mm)	D <sub>i</sub> (mm)	DN (mm)



25	40	22.6	25	•	FDK:083G2139
38	60	35.6	40		FDK:083G2141
51	70	48.6	50	•	FDK:083G2142
63.5	85	60.3	65		FDK:083G2143
76	98	72	65 <sup>2)</sup>		FDK:083G2144

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- D<sub>o</sub>: Outer diameter
- D<sub>i</sub>: Inner diameter
- 1) SMS 1145 standard is not approved by 3A
- 2) Default delivery

SITRANS F M

### Flow sensor MAG 1100 F

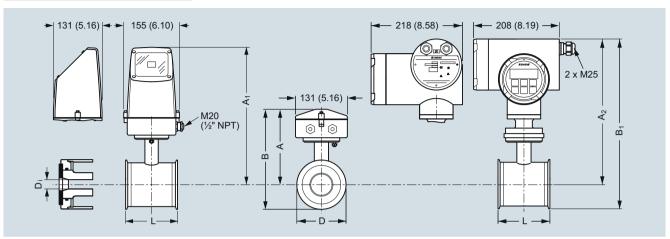
Spare parts for MAG 1100 F		Article No.
Gaskets		
(delivered in pairs, to be placed between flow sensor and adapter)		
MAG 1100 F (PFA) - P gaskets		
Rubber: EPDM (FDA)		
• DN 10		A5E02055286
• DN 15		A5E02055287
• DN 25		7.020200200
• DN 40		A5E02055291
• DN 50		A5E02055292
• DN 65 • DN 80	•	
• DN 100	-	
	_	71020200207
MAG 1100 F (ceramic) - flat gaskets		
Rubber: FKM/FPM (FDA)  • DN 10	•	A5E00915707
• DN 15		A5E00915764
• DN 25	•	A5E00915771
• DN 40		A5E00915773
• DN 50	•	A5E00915775
• DN 65		A5E00915780
• DN 80	•	
• DN 100		A5E00915784
MAG 1100 F (PFA) - flat gaskets		
Rubber: EPDM (FDA)		EDV-000C000C
• DN 10 • DN 15		FDK:083G2206 FDK:083G2207
• DN 25	•	
• DN 40	•	FDK:083G2211
• DN 50	•	FDK:083G2212
• DN 65	•	FDK:083G2213
• DN 80		FDK:083G2214
• DN 100		FDK:083G2215
Rubber: NBR		
• DN 10		FDK:083G2216
• DN 15		FDK:083G2217
• DN 25 • DN 40		FDK:083G2219 FDK:083G2221
• DN 50 • DN 65		FDK:083G2222 FDK:083G2223
• DN 80		FDK:083G2224
• DN 100		FDK:083G2225

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Flow sensor MAG 1100 F

### Dimensional drawings

Sensor MAG 1100 F compact/remote



Dimensions in mm (inch)

### Important note:

For compact installation with MAG 6000 I/Ex - Supports the transmitter to avoid tension on the sensor part.

Size	L	Α	A <sub>1</sub> <sup>3)</sup>	B <sup>2)</sup>	B <sub>1</sub>	D	D <sub>i</sub> (Al <sub>2</sub> O <sub>3</sub> )	D <sub>i</sub> PFA	Weight <sup>1)</sup>
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
10	64	161	315	193.7	344.7	64.0	10	10	2.2
15	64	161	315	193.7	344.7	64.0	15	16	2.2
25	79	169	323	207.5	359.0	77.5	25	26	2.7
40	94	179	333	228.0	379.0	91.0	40	38	3.4
50	104	188	342	247.7	398.7	119.0	50	50	4.2
65	131	197.5	351	262.6	413.6	130.0	65	66	5.5
80	156	204	357	281.0	432.0	155.0	80	81	7.0
100	186	217	370	308.0	459.0	183.0	100	100	10.0

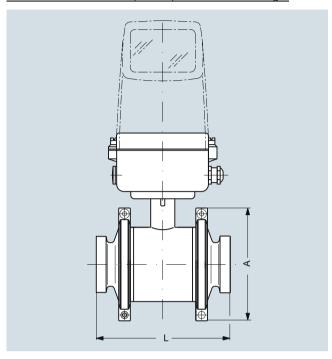
Size	L	Α	A <sub>1</sub> <sup>3)</sup>	B <sup>2)</sup>	В <sub>1</sub>	D	D <sub>i</sub>	D <sub>i</sub> PFA	Weight <sup>1)</sup>
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	(Al <sub>2</sub> O <sub>3</sub> ) [inch]	[inch]	[lb]
3/8	2.52	6.34	12.40	7.62	13.57	2.52	0.39	0.39	4.8
1/2	2.52	6.34	12.40	7.62	13.57	2.52	0.59	0.63	4.8
1	3.11	6.66	12.72	8.17	14.13	3.05	0.98	1.02	4.9
11/2	3.70	7.05	13.11	8.98	14.92	3.58	1.57	1.50	7.5
2	4.09	7.40	13.47	9.75	15.70	4.68	1.97	1.97	9.2
21/2	5.16	7.78	13.82	10.34	16.28	5.12	2.56	2.60	12.0
3	6.14	8.03	14.06	11.06	17.01	6.10	3.15	3.19	15.0
4	7.32	8.54	14.57	12.13	18.07	7.20	3.94	3.94	22.0

With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb) With MAG 6000 I weight is increased with 5.5 kg (12.1 lb)
 14.5 mm (0.571") shorter when the AISI terminal box is used (always Ex version)
 A<sub>2</sub> is 3 mm (0.12") shorter than A<sub>1</sub>

SITRANS F M

### Flow sensor MAG 1100 F

Sensor MAG 1100 F compact/separate – build-in length



Size		Α		L <sup>1)</sup>	
DN	inch	[mm]	[inch]	[mm]	[inch]
10	3/8	99	3.90	146	5.75
15	1/2	99	3.90	146	5.75
25	1	113	4.45	161	6.34
40	1½	126	4.96	176	6.93
50	2	154	6.06	186	7.32
65	2½	165	6.50	223	8.78
80	3	200	7.87	258	10.16
100	4	225	8.86	288	11.34

 $<sup>^{1)}\,</sup>$  The total build-in length "L" is independent of the adapter type selected.

### Flow sensor MAG 3100 and MAG 3100 HT

### Overview



The SITRANS F M MAG 3100 is an electromagnetic flow sensor in a large variety that meets the demands of almost every flow application.

#### Benefits

- Wide range of sizes: DN 15 to DN 2000 (1/2" to 78")
- The flexible design is for all applications not covered by the standard industry-specific sensors: MAG 1100, MAG 1100 F, MAG 3100 P and MAG 5100 W
- Wide pressure range: PN 6 to PN 100 ANSI Class 150/300, AS 2129, AS 4087, JIS K10 and K20. On request up to 690 bar (10 000 psi)
- Wide range of electrode and liner material to fit even the most extreme process media
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Designed to allow patented SITRANS F M in-situ verification using the SENSORPROM fingerprints.

### Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- · Steel industry
- Mining
- Utility
- · Power generation and distribution
- · Oil and gas / HPI
- Water and waste water

### Design

- Compact or remote mounting possible
- · Easy "plug & play" field changeability of transmitter
- Ex ATEX and FM/CSA versions
- High temperature sensor for applications with temperatures up to 180 °C (356 °F)
- Approvals for PTB and OIML R 117
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges
- Build-in length according to ISO 13359, the standard includes sizes up to DN 400
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

#### Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

#### Integration

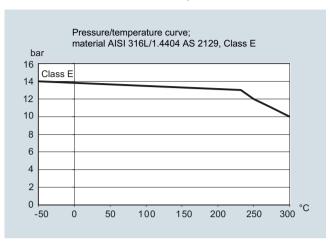
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

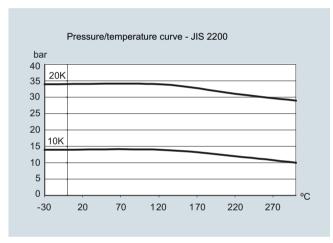
SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

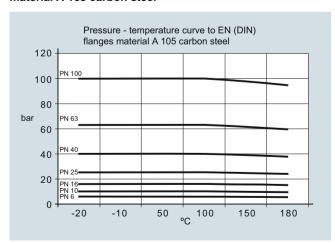
#### Pressure/temperature curve; material AISI 316L/1.4404 AS 2129, Class E



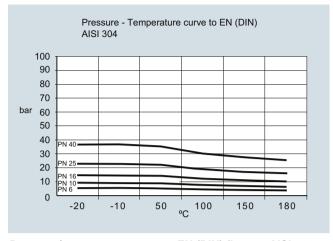
### Pressure/temperature curve - JIS 2200



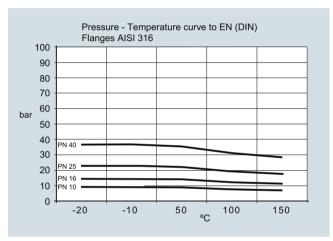
## Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel



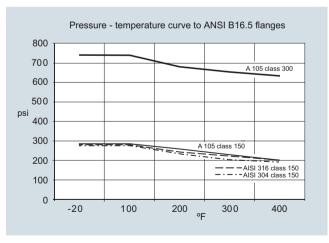
### Pressure/temperature curve to EN (DIN) flanges AISI 304



### Pressure/temperature curve to EN (DIN) flanges AISI 316



### Pressure/temperature curve to ANSI B16.5 flanges



**Note:** The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

### Flow sensor MAG 3100 and MAG 3100 HT

### Technical specifications

Version	MAG 3100	MAG 3100 HT (High Temperature)
Product characteristic	Flexible product program	Flexible product program
Nominal size	DN 15 DN 2000 (½" 78")	DN 15 DN 300 (½" 12")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	<ul> <li>DN 15 65 (½" 2½"): 12.5 Hz/15 Hz</li> <li>DN 80 150 (3" 6"): 6.25 Hz/7.5 Hz</li> <li>DN 200 1200 (8" 48"): 3.125 Hz/3.75 Hz</li> <li>DN 1400 2000 (54" 78"): 1.5625 Hz/1.875 Hz</li> </ul>	<ul> <li>DN 15 65 (½" 2½"): 12.5 Hz/15 Hz</li> <li>DN 80 150 (3" 6"): 6.25 Hz/7.5 Hz</li> <li>DN 200 300 (8" 12"): 3.125 Hz/3.75 Hz</li> </ul>
Process connection		
Flanges	EN 1092-1, raised face <sup>1)</sup> (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions)  • DN 65 2000 (2½" 78"): PN 6 (87 psi)  • DN 200 2000 (8" 78"): PN 10 (145 psi)  • DN 65 2000 (2½" 78"): PN 16 (232 psi)  • DN 200 600 (½" 24"): PN 25 (362 psi)  • DN 15 600 (½" 24"): PN 40 (580 psi)  • DN 50 300 (2" 12"): PN 63 (913 psi)  • DN 25 300 (1" 12"): PN 100 (1450 psi)  ANSI B16.5 (~BS 1560), raised face  • ½" 24": Class 150 (20 bar (290 psi))  • ½" 24": Class 300 (50 bar (725 psi))  AWWA C-207, flat face 28" 78": Class D (10 bar)  AS 2129, raised face ½" 48": Table E  AS 4087, raised face:  • PN 16 (DN 50 1200, 16 bar (232 psi))  • PN 21 (DN 50 600, 21 bar (304 psi))  • PN 35 (DN 50 600, 35 bar (508 psi))  JIS B 2220:2004  • K10 (1" 24")  • K20 (1" 24")	EN 1092-1, raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions)  • DN 15 300 (½" 12"): PN 40 (580 psi)  • DN 65 300 (2½" 12"): PN 16 (232 psi)  • DN 200 300 (8" 12"): PN 10 (145 psi)  • DN 200 300 (8" 12"): PN 25 (362 psi)  ANSI B16.5 (~BS 1560), raised face:  • ½" 12": Class 150 (20 bar (290 psi))  • ½" 12": Class 300 (50 bar (725 psi))  AS 2129, raised face ½" 12": Table E
	Other flanges and pressure ratings on request	Other flanges and pressure ratings on request
Rated operation conditions  Ambient temperature (conditions also dependent on liner characteristiques)		
Standard sensor	-40 +100 °C (-40 +212 °F)	-40 +100 °C (-40 +212 °F)
<ul><li>Ex sensor</li><li>With compact transmitter</li></ul>	-20 +60 °C (-4 +140 °F)	For medium temperature up to 150 °C (302 °F): -20 +60 °C (-4 +140 °F) For medium temperature 150 180 °C (302 356 °F): -20 +50 °C (-4 +122 °F)
- MAG 5000/6000 <sup>2)</sup>	-20 +60 °C (-4 +140 °F)	-20 +60 °C (-4 +140 °F)
- MAG 6000 I	-20 +60 °C (-4 +140 °F)	-20 +60 °C (-4 +140 °F)
- MAG 6000 I Ex	-20 +60 °C (-4 +140 °F)	-20 +60 °C (-4 +140 °F)
- IVIAG UUUU I EX	-20 +00 O (-4 + 140 F)	-20 +00 O (-4 + 140 F)

### SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

Version	MAG 3100	MAG 3100 HT (High Temperature)
Operating pressure [abs. bar]	• Soft rubber 0.01 100 bar	PTFE Teflon
(maximum operating pressure decreases with increasing oper-	(0.15 1450 psi)	- DN 15 300 (½" 12") (130/180 °C (266 °F/356°F)):
ating temperature and with stain-	<ul><li>EPDM 0.01 40 bar (0.15 580 psi)</li><li>Linatex 0.01 40 bar</li></ul>	0.3/0.6 50 bar (4/8 725 psi) (180 °C (356 °F)
less steel flanges)	(0.15 580 psi)	PTFE has factory mounted grounding SS rings type E and SS terminal box)
	• Ebonite 0.01 100 bar (0.15 1450 psi)	• PFA - DN 15 150 (½" 6"):
	• PTFE	Vacuum 0.02 50 bar
	- DN ≤ 300 (≤ 12"): 0.3 50 bar (4 725 psi)	(0.29 725 psi)
	- 350 ≤ DN ≤ 600 (14" ≤ DN ≤ 24"): 0.3 40 bar (4 580 psi)	
	• PFA	
	- DN 15 150 (½" 6"): Vacuum 0.02 50 bar (0.29 725 psi)	
Enclosure rating	IP67 to EN 60529/NEMA 4X/6, 1 mH <sub>2</sub> O for 30 min	IP67 to EN 60529/NEMA 4X/6, 1 mH <sub>2</sub> O for 30 min
Proceure drap at 2 m/s	Option: IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont.	Option: IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont.
Pressure drop at 3 m/s Test pressure		igth pipe ere applicable)
Mechanical load (vibration)		• 18 1000 Hz random in x, y, z, directions for 2 hours
	according to EN 60068-2-36	according to EN 60068-2-36
	<ul> <li>Sensor: 3.17 g RMS</li> <li>Sensor with compact MAG 5000/ 6000 mounted trans-</li> </ul>	<ul><li>Sensor: 3.17 g RMS</li><li>Sensor with compact MAG 5000/ 6000 mounted trans-</li></ul>
	mitter: 3.17 g RMS	mitter: 3.17 g RMS
	transmitter: 1.14 g RMS	<ul> <li>Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS</li> </ul>
Temperature of medium	• Soft rubber 0 +70 °C (32 158 °F)	• PTFE -20 +130 °C (-4 +266 °F)
	• EPDM -10 +70 °C (14 158 °F) • Linatex (rubber) -40 +70 °C	PTFE -20 +180 °C (-4 +356 °F) Factory mounted grounding rings type E in SS and SS terminal box. Can
	(-40 +158 °F) (for temperatures below -20 °C (-4 °F) AISI 304 or	only be used with remote transmitter.  • PFA -20 +150 °C (-4 +300 °F)
	316 flanges must be used)	**************************************
	• Ebonite 0 95 °C (32 203 °F)	
	• PTFE -20 +100 °C (-4 +212 °F) • PFA -20 +100 °C (-4 +212 °F)	
EMC	2004/108/EC	2004/108/EC
Design		
Weight	See dimensi	onal drawings
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (150 μm/300 μm)	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (150 µm/)
	or Stainless steel AISI 304/1.4301 flanges and carbon	or AISI 304/1.4301 flanges and carbon steel housing, with
	steel housing, with corrosion resistant two component epoxy coating (150 $\mu$ m/300 $\mu$ m)	corrosion resistant two component epoxy coating (min. 150 $\mu$ m)
	or Stainless steel AISI 316L/1.4404 flanges and housing, polished	or AISI 316L/1.4404 flanges and housing, polished
Measuring pipe material	Stainless steel AISI 304/1.4301	AISI 304/1.4301
Electrode material	• Stainless steel AISI 316Ti/1.4571	• AISI 316Ti/1.4571
	Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602)     Platinum (Iridium)	Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602)     Platinum (Inidium)
	Platinum/Iridium     Titanium	Platinum/Iridium     Titanium
	• Tantalum	• Tantalum
Grounding electrode	• Soft rubber, EPDM, Linatex, Ebonite:	
material	available with measuring electrodes in stainless steel AISI 316Ti/1.4571 or Hastelloy	
	• PTFE: none	• PTFE: none
	PFA: optional in Hastelloy, Tantalum or Platinium	PFA: optional in Hastelloy, Tantalum or Platinium

### Flow sensor MAG 3100 and MAG 3100 HT

Version	MAG 3100	MAG 3100 HT (High Temperature)		
Design (continued)				
Terminal box (remote version only)	<ul> <li>Standard fibre glass reinforced polyamide</li> <li>Option Stainless steel AISI 316/1.4436</li> <li>Ex Stainless steel AISI 316/1.4436</li> </ul>	<ul> <li>Standard fibre glass reinforced polyamide (max. 150 °C (302 °F))</li> <li>Stainless steel AISI 316/1.4436</li> <li>Ex Stainless steel AISI 316/1.4436</li> </ul>		
Cable entries	<ul> <li>Remote installation 2 x M20 or 2 x ½" NPT</li> <li>Compact installation</li> <li>MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT</li> <li>MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output)</li> <li>MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output)</li> </ul>	• Remote installation 2 x M20 or 2 x ½" NPT		
Certificates and approvals				
Calibration				
<ul> <li>Standard production calibration (default), calibration report shipped with sensor</li> </ul>	Zero-point, 2 x 25 % and 2 x 90 % (default)	Zero-point, 2 x 25 % and 2 x 90 % (default)		
Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q <sub>max</sub> 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q <sub>max</sub> Matched-pair calibration: default, 5-point or 10-point			
Conforms to	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC <sup>3)</sup> CRN	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC <sup>3)</sup> CRN		
Material certificate EN 10204-3.1	Available when ordering together with meter <sup>4)</sup>	Available when ordering together with meter <sup>4)</sup>		
Ex approvals <sup>5)</sup>	Ex sensors  • ATEX 2 GD DN 15 300: EEx d e ia IIC T4 - T6  • DN 350 2000: EEx e ia IIC T4 - T6  • IEC Ex de ia IIC T3-T6  • FM Class I/II/III, Div 1 <sup>6</sup> )  • FM Class I, Zone 1/21  • CSA Class I, Zone 1	Ex sensors  • ATEX 2 GD DN 15 300: EEx d e ia IIC T3 - T6  • IEC Ex de ia IIC T3-T6  • FM Class  / /  II, Div 16)  • FM Class I, Zone 1/21  • CSA Class I, Zone 1		
	Standard sensors	Standard sensors		
	• FM Class I, Div 2/Zone 2	• FM Class I, Div 2/Zone 2		
	CSA Class I, Div 2/Zone 2	CSA Class I, Div 2/Zone 2		
Drinking water approvals	<ul> <li>EPDM lining:</li> <li>WRAS (WRc, BS690 cold water, GB)</li> <li>NSF/ANSI Standard 61<sup>7)</sup> (Cold water, US)</li> <li>ACS listed (F)</li> <li>DVGW W270 (D)</li> <li>Belgaqua (B)</li> </ul>			
	<ul> <li>MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes)</li> </ul>			
Custody transfer (CT) (≤ DN2000)	Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)	Hot water pattern approval - PTB (Germany)		
(only together with MAG 5000/6000 CT), order as special	Hot water pattern approval - PTB (Germany)			
opeoid:	Other media than water - OIML R 117 (Denmark)			

Technical specification for transmitter - see transmitter pages.

 $<sup>^{1)}</sup>$  PN 6-40: DN  $\leq$  600 type 01 (SORF); DN > 600 type 11 (WNRF); PN 63-100: type 11 (WNRF)

<sup>2)</sup> With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F).

<sup>3)</sup> For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the Pressure Equipment directive, also products sold into certain market sectors are excluded. These include:

a) Meters used in networks for the supply, distribution and discharge of water.

b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
c) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment.
d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 9/6.

<sup>&</sup>lt;sup>4)</sup> Has to be ordered with the meter. It is not possible to order the certificate afterwards.

 $<sup>^{5)}</sup>$  Not for sensors with 300  $\mu m$  coating.

 $<sup>^{6)}</sup>$  Only with sensors sizes DN 15 ... 300 (1/2" ... 12") compact.

<sup>7)</sup> Including Annex G

SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data	Article No.	Selecti
Sensor SITRANS F M MAG 3100	7 M E 6 3 1 0 -	Sensor
→ Click on the Article No. for the online configura	-	Flange
tion in the PIA Life Cycle Portal.		Carbon
Diameter		Stainles
DN 15 (½") (PTFE and PFA liner)	1 V	coating Stainles
DN 25 (1")	2 D	AISI 31
DN 40 (1½")	2 R	Carbon
DN 50 (2")	2 Y	Stainles
DN 65 (2½")	3 F	coating
DN 80 (3")	3 M	Liner n
DN 100 (4")	3 T	Soft rub
DN 125 (5")	4 B	EPDM
DN 150 (6")	4 H	PTFE (I
DN 200 (8")	4 P	1 11 1
DN 250 (10")	4 V	Ebonite
DN 300 (12")	5 D	Linatex
DN 350 (14")	5 K	PFA (C
DN 400 (16") DN 450 (18")	5 R 5 Y	(P
,		Electro (Ground
DN 500 (20") DN 600 (24")	6 F 6 P	Pressui
DN 700 (24")	6 Y	AISI 31
DN 750 (30") (AWWA and AS 2129 only)	7 D	Hastell
DN 800 (32")	7 H	(PFA lir
DN 900 (36")	7 M	Platinu
DN 1000 (40")	7 R	Titaniur
DN 1050 (42") (AWWA only)	7 U	Tantalu
DN 1100 (44") (AWWA only)	7 V	Hastell (only P
DN 1200 (48")	8 B	Platiniu
DN 1400 (54")	8 F	Tantalu
DN 1500 (60")	8 K	Transn
DN 1600 (66")	8 P	Standa
DN 1800 (72")	8 T	mitter s
DN 2000 (78")	8 Y	Ex sens
Flange norm and pressure rating		separa
EN 1092-1		MAG 6
PN 6 (DN 65 2000 (2½" 78")) PN 10 (DN 200 2000 (8" 78"))	A B	MAG 6
PN 16 (DN 65 1200 (2½" 48"))	C	MAG 6
PN 16, non-PED (DN 700 2000 (28" 78"))	D	MAG 6
PN 25 (DN 200 600 (8" 24")) <sup>1)</sup>	E	
PN 40 (DN 15 600 (½" 24"))	F	MAG 5 MAG 5
PN 63 (DN 50 300 (2" 12"))	G	
PN 100 (DN 25 300 (1" 12"))	H	Comm No con
ANSI B16.5		HART
Class 150 (½" 24")	J	PROFIL
Class 300 (1/2" 24")	К	PROFIL
AWWA C-207		(only M
Class D (28" 78")	L	Modbu
<u>AS</u>		(only M
2129, table E	M	FOUNE 6000 I)
4087, PN 16 (DN 50 1200 (2" 48"))	N	
(Not PTFE and PFA) 4087, PN 21 (DN 50 600 (2" 24"))	Р	Cable (
4087, PN 21 (DN 50 600 (2 24 )) (Not PTFE and PFA)		Metric: ½" NPT
4087, PN 35 (DN 50 600 (2" 24"))	Q	Metric:
(Not PTFE and PFA)		steel M
JIS B 2220:2004		1/2" NPT:
K10 (1" 24")	R	steel M
K20 (1" 24")	S	1) Unde

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100	7ME6310-
	HEREN-HERE
Flange material and coating Carbon steel flanges ASTM A 105, 150 μm coating Stainless steel flanges, AISI 304/1.4301, 150 μm coating	1 2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished Carbon steel flanges ASTM A 105, 300 µm coating Stainless steel flanges, AISI 304/1.4301, 300 µm coating	3 4 5
Liner material	
Soft rubber EPDM  PTFE (DN $\leq$ 300, PN $\leq$ 50 bar / $\leq$ 12", PN $\leq$ 725 psi),	1 2 3
PTFE (DN ≤ 300, PN ≤ 30 bat / ≤ 12 , PN ≤ 725 psi),  PTFE (350 ≤ DN ≤ 600, PN ≤ 40 bat /  14" ≤ DN ≤ 24", PN ≤ 580 psi)  Ebonite	4
Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24")) PFA (DN 15 150 (½" 6")) (PN ≤ 40 bar (580 psi))	5 7
Electrode material (Grounding electrodes not for PTFE liner or Pressure PN 100)	
AISI 316Ti/1.4571 (not for PFA) Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	1 2
Platinum (DN ≤ 300 (12")) (not ebonite liner)	3
Titanium (not PFA liner) (DN $\leq$ 600 (24")) Tantalum (DN $\leq$ 600 (24")) (not ebonite liner) Hastelloy C22/2.4602 incl. grounding electrodes	4 5 6
(only PFA) Platinium incl. grounding electrodes (only PFA)	7
Tantalum incl. grounding electrodes (only PFA)	8
Transmitter with display	
Standard sensor for remote transmitter (Order transmitter separately)  Ex sensor for remote transmitter (Order transmitter separately)	A B
MAG 6000 I, Alu.18 90 V DC, 115 230 V AC	С
MAG 6000 I Alu. 18 30 V DC, Ex MAG 6000 I Alu. 115 230 V, Ex MAG 6000 Polyamide, 11 30 V DC / 1124 V AC	D E H
MAG 6000, Polyamide, 115 230 V AC MAG 5000, Polyamide, 11 30 V DC / 1124 V AC	J K
MAG 5000, Polyamide, 115 230 V AC	L
Communication	
No communication, add-on possible HART PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	A B F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	Ğ
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) FOUNDATION Fieldbus H1 (only MAG 6000/MAG	E
6000 I)	- J
Cable glands/terminal box	
Metric: Polyamide terminal box or 6000 I compact 1/2" NPT: Polyamide terminal box or 6000 I compact Metric: SS terminal box (mandatory for stainless stool MAG 6000 Transmitter)	2
steel MAG 6000 Transmitter) 1/2" NPT: SS terminal box (mandatory for stainless steel MAG 6000 Transmitter)	4

<sup>1)</sup> Under preparation

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
<ul> <li>5-point calibration for DN 15 DN 200<sup>1)</sup></li> <li>5-point calibration for DN 250 DN 600<sup>1)</sup></li> <li>5-point calibration for DN 700 DN 1200<sup>1)</sup></li> </ul>	D01 D02 D03
<ul> <li>10-point calibration for DN 15 DN 200<sup>2)</sup></li> <li>10-point calibration for DN 250 DN 600<sup>2)</sup></li> <li>10-point calibration for DN 700 DN 1200<sup>2)</sup></li> </ul>	D06 D07 D08
<ul> <li>Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 DN 200</li> </ul>	D11
<ul> <li>Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 DN 600</li> <li>Default (2 x 25 % and 2 x 90 %) match pair calibration</li> </ul>	D12
<ul> <li>Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 DN 1200</li> </ul>	
<ul> <li>5-point, matched-pair calibration for DN 15 DN 200<sup>1)</sup></li> <li>5-point, matched-pair calibration for</li> </ul>	D15
DN 250 DN 600 <sup>1)</sup>	D17
<ul> <li>5-point, matched-pair calibration for DN 700 DN 1200<sup>1)</sup></li> </ul>	
<ul> <li>10-point, matched-pair calibration for DN 15 DN 200<sup>2)</sup></li> </ul>	D18
10-point, matched-pair calibration for DN 250 DN 600 <sup>2)</sup>	D19
<ul> <li>10-point, matched-pair calibration for DN 700 DN 1200<sup>2)</sup></li> </ul>	D20
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific converter setup	Y20
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex)	Y41
Other postproduction requirements (add desired text)	Y99
Additional calibrations	
<ul> <li>Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005</li> </ul>	On request <sup>3)</sup>
<ul> <li>CT verification and authority seal according to: Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)</li> </ul>	On request <sup>3)</sup>
Customer-witnessed calibration     Any of above calibration	On request <sup>3)</sup>

### $^{1)}\,$ 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{\mbox{\scriptsize max}}$

### Operating instructions for SITRANS F M MAG 3100

Description	Article No.	
• English	A5E03005599	
<ul> <li>German</li> </ul>	A5E03086288	
<ul> <li>Spanish</li> </ul>	A5E03086291	
• French	A5E03086290	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I ATEX 2G D transmitters and sensors are delivered compact mounted from factory.

Communication module will be pre-mounted in the transmitter.

 $<sup>^{2)}</sup>$  Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory  $\rm Q_{max}$ 

<sup>3)</sup> Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data				Article No.					
Sensor SITRANS F M	7 N	ΙE	6 3	3 2	0	-			
MAG 3100 HT (High Temperature)			١	-		4	l		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.									
Diameter									
DN 15 (½") DN 25 (1")	1 V								
DN 40 (1½")	2 R								
DN 50 (2")	2 Y								
DN 65 (2½")	3 F								
DN 80 (3") DN 100 (4")	3 T								
DN 125 (5")	4 B								
DN 150 (6")	4 H								
DN 200 (8") DN 250 (10")	4 P								
DN 300 (12")	5 D								
Flange norm and pressure rating									
EN 1092-1									
PN 10 (DN 200 300 (8" 12")) PN 16 (DN 65 300 (2½" 12"))		B							
PN 25 (DN 200 300 (8" 12"))		E							
PN 40 (DN 15 300 (½" 12"))		F							
ANSI B16.5 Class 150 (½" 12")		J							
Class 300 (½" 12")		K							
<u>AS</u>									
2129, table E		M							
Flange material  Carbon stool flanges ASTM A 105			1						
Carbon steel flanges ASTM A 105 Stainless steel flanges, AISI 304/1.4301			2						
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished			3						
Liner material PTFE (130 °C (266 °F))			2	,					
PTFE including type E protection rings			3						
AISI 316/1.4436 (180 °C (356 °F)) PFA (150 °C (302 °F)) (DN 15 150 (½" 6"))			7	,					
Electrode material									
AISI 316Ti/1.4571 (not for PFA)					1				
Hastelloy C276/2.4819					2				
(PFA liner: Hastelloy C22/2.4602) Platinum					3				
Titanium (not for PFA)					4				
Tantalum					5 6				
Hastelloy C22/2.4602 incl. grounding electrodes (only PFA)					Ĭ				
Platinium incl. grounding electrodes (only PFA) Tantalum incl grounding electrodes (only PFA)					7 8				
Transmitter with display									
Standard sensor for remote transmitter (Order transmitter separately)						Α			
Ex sensor for remote transmitter (Order transmitter						В			
separately) MAG 6000 I, Alu.18 90 V DC, 115 230 V AC						С			
MAG 6000 I, Alu. 18 30 V DC, Ex						D			
MAG 6000 I, Alu. 115 230 V AC, Ex						E			
MAG 6000, Polyamide, 11 30 V DC/ 11 24 V AC						Н			
MAG 6000, Polyamide, 115 230 V AC						J			
MAG 5000, Polyamide, 11 30 V DC/ 11 24 V AC						K			
MAG 5000, Polyamide, 115 230 V AC						L			

Selection and Ordering data	Article No.		
Sensor SITRANS F M	7 M E 6 3 2 0 -		
MAG 3100 HT (High Temperature)			
Communication			
No communication, add-on possible	A		
HART	В		
PROFIBUS PA Profile 3	F		
(only MAG 6000/MAG 6000 I)			
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	G		
Modbus RTU/RS 485	E		
(only MAG 6000/MAG 6000 I)			
FOUNDATION Fieldbus H1	J		
(only MAG 6000/MAG 6000 I)			
Cable glands/terminal box			
Metric: Polyamide terminal box (PTFE 130 °C (266 °F)) or 6000 I compact		1	
½" NPT: Polyamide terminal box (PTFE 130 °C		2	
(266 °F)) or 6000 I compact			
Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)		3	
1/2" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)		4	

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Customer-specific converter setup	Y20
Tag name made, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex)	Y41
Other postproduction requirements (add desired text)	Y99
Additional calibrations	
Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request <sup>1)</sup>
Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request <sup>1)</sup>
<ul> <li>Customer-specified calibration up to 10 points</li> </ul>	On request <sup>1)</sup>
CT verification and authority seal according to: Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)	On request <sup>1)</sup>
Customer-witnessed calibration     Any of above calibration	On request <sup>1)</sup>

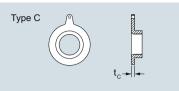
Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

### Flow sensor MAG 3100 and MAG 3100 HT

### Selection and Ordering data

MAG 3100 and MAG 3100 HT<sup>1)</sup> Type C Grounding and protection rings

1 pc. AISI 304 grounding and protection ring  $\mbox{type}$   $\mbox{\bf C}$  for all liners except PTFE and PFA



DN	PN 6	PN 10	PN 16	DN OF	PN 40	AS 2129 Table E
DN	Article No.	Article No.	Article No.	PN 25 Article No.	Article No.	AS 2129 Table E
DN 25 DN 40 DN 50					FDK:083N8361 FDK:083N8362 FDK:083N8344	FDK:083N8361 FDK:083N8362 FDK:083N8344
DN 65 DN 80 DN 100	FDK:083N8345 FDK:083N8347 FDK:083N8070		FDK:083N8345 FDK:083N8347 FDK:083N8025		FDK:083N8345 FDK:083N8347 FDK:083N8025	FDK:083N8346 FDK:083N8347 FDK:083N8025
DN 125 DN 150 DN 200	FDK:083N8071 FDK:083N8072 FDK:083N8074	FDK:083N8011	FDK:083N8071 FDK:083N8008 FDK:083N8011	FDK:083N8011	FDK:083N8071 FDK:083N8073 FDK:083N8075	FDK:083N8071 FDK:083N8008 FDK:083N8011
DN 250 DN 300 DN 350	FDK:083N8078 FDK:083N8080 FDK:083N8083	FDK:083N8013 FDK:083N8012 FDK:083N8039	FDK:083N8013 FDK:083N8012 FDK:083N8039	FDK:083N8013 FDK:083N8081 FDK:083N8084	FDK:083N8079 FDK:083N8082 FDK:083N8085	FDK:083N8013 FDK:083N8012 FDK:083N8039
DN 400 DN 450 DN 500	FDK:083N8099 FDK:083N8103 FDK:083N8107	FDK:083N8100 FDK:083N8103 FDK:083N8107	FDK:083N8100 FDK:083N8104 FDK:083N8108	FDK:083N8101 FDK:083N8104 FDK:083N8108	FDK:083N8102 FDK:083N8105 FDK:083N8109	FDK:083N8100 FDK:083N8104 FDK:083N8108
DN 600 DN 700 DN 750	FDK:083N8111 FDK:083N8300	FDK:083N8111 FDK:083N8294	FDK:083N8112 FDK:083N8294	FDK:083N8112		FDK:083N8113 FDK:083N8372
DN 800 DN 900 DN 1000	FDK:083N8303 FDK:083N8306 FDK:083N8309	FDK:083N8304 FDK:083N8307 FDK:083N8310	FDK:083N8304 FDK:083N8307 FDK:083N8310			FDK:083N8373 FDK:083N8396 FDK:083N8397
DN 1100 DN 1200 DN 1400	FDK:083N8312 FDK:083N8467	FDK:083N8367 FDK:083N8313 FDK:083N8468	FDK:083N8367 FDK:083N8313 FDK:083N8469			FDK:083N8367 FDK:083N8398
DN 1500 DN 1600 DN 1800 DN 2000	FDK:083N8471 FDK:083N8475 FDK:083N8479 FDK:083N8483	FDK:083N8472 FDK:083N8476 FDK:083N8480 FDK:083N8484	FDK:083N8473 FDK:083N8477 FDK:083N8481 FDK:083N8485			

<sup>1)</sup> Also for MAG 5100 W (7ME6520 > DN 300; and 7ME6580).

Size	ANSI				Size	AWWA C-207
	Class 150	Class 300	JIS K10	JIS K20		
	Article No.	Article No.	Article No.	Article No.		Article No.
1"	FDK:083N8361	FDK:083N8361	FDK:083N8361	FDK:083N8361	28"	FDK:083N8302
1½"	FDK:083N8362	FDK:083N8362	FDK:083N8362	FDK:083N8362	30"	FDK:083N8366
2"	FDK:083N8344	FDK:083N8344	FDK:083N8344	FDK:083N8344	32"	FDK:083N8305
21/2"	FDK:083N8345	FDK:083N8345	FDK:083N8345	FDK:083N8345	36"	FDK:083N8308
3"	FDK:083N8347	FDK:083N8347	FDK:083N8347	FDK:083N8347	40"	FDK:083N8311
4"	FDK:083N8025	FDK:083N8025	FDK:083N8070	FDK:083N8025	42"	FDK:083N8394
5"	FDK:083N8071	FDK:083N8071	FDK:083N8071	FDK:083N8071	44"	FDK:083N8395
6"	FDK:083N8008	FDK:083N8073	FDK:083N8008	FDK:083N8008	48"	FDK:083N8314
8"	FDK:083N8011	FDK:083N8076	FDK:083N8011	FDK:083N8011	54"	FDK:083N8470
10"	FDK:083N8013	FDK:083N8079	FDK:083N8013	FDK:083N8079	60"	FDK:083N8474
12"	FDK:083N8012	FDK:083N8082	FDK:083N8012	FDK:083N8081	66"	FDK:083N8478
14"	FDK:083N8039	FDK:083N8085	FDK:083N8083	FDK:083N8039	72"	FDK:083N8482
16"	FDK:083N8100	FDK:083N8102	FDK:083N8100	FDK:083N8101	78"	FDK:083N8486
18"	FDK:083N8104	FDK:083N8106	FDK:083N8103	FDK:083N8104		
20"	FDK:083N8107	FDK:083N8110	FDK:083N8107	FDK:083N8108		
24"	FDK:083N8113	FDK:083N8114	FDK:083N8111	FDK:083N8112		

SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

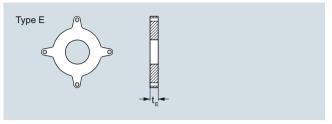
### Selection and Ordering data

MAG 3100 and 3100 HT Type E grounding and protection ring

1 pc. AISI 316 grounding and protection ring  $\mbox{\bf type}~\mbox{\bf E}$  for PTFE liners incl. straps and screws

#### Note:

For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C (356 °C) versions - grounding ring type E is included and factory mounted.



DN	PN 6 Article No.	PN 10 Article No.	PN 16 Article No.	PN 25 Article No.	PN 40 Article No.
DN 15					FDK:083N8365
DN 25					FDK:083N8271
DN 40					FDK:083N8278
DN 50					FDK:083N8282
DN 65	FDK:083N8284		FDK:083N8285		FDK:083N8286
DN 80	FDK:083N8288		FDK:083N8289		FDK:083N8290
DN 100	FDK:083N8116		FDK:083N8117		FDK:083N8118
DN 125	FDK:083N8120		FDK:083N8121		FDK:083N8122
DN 150	FDK:083N8124		FDK:083N8125		FDK:083N8126
DN 200	FDK:083N8129	FDK:083N8130	FDK:083N8130	FDK:083N8131	FDK:083N8132
DN 250	FDK:083N8135	FDK:083N8136	FDK:083N8137	FDK:083N8138	FDK:083N8139
DN 300	FDK:083N8144	FDK:083N8144	FDK:083N8145	FDK:083N8146	FDK:083N8147
DN 350	FDK:083N8152	FDK:083N8153	FDK:083N8154	FDK:083N8155	FDK:083N8156
DN 400	FDK:083N8160	FDK:083N8161	FDK:083N8162	FDK:083N8163	FDK:083N8164
DN 450	FDK:083N8168	FDK:083N8169	FDK:083N8170	FDK:083N8171	FDK:083N8172
DN 500	FDK:083N8177	FDK:083N8178	FDK:083N8179	FDK:083N8180	FDK:083N8181
DN 600	FDK:083N8186	FDK:083N8187	FDK:083N8188	FDK:083N8189	

Protection of PTFE liner use 2 pcs. Earthing of PTFE lined flowmeter use 1 pc.

Size	ANSI			
	Class 150	Class 300	JIS K10	JIS K20
	Article No.	Article No.	Article No.	Article No.
1/2"	FDK:083N8365	FDK:083N8365		
1"	FDK:083N8272	FDK:083N8272	FDK:083N8271	FDK:083N8271
1½"	FDK:083N8279	FDK:083N8279	FDK:083N8278	FDK:083N8278
2"	FDK:083N8283	FDK:083N8283	FDK:083N8282	FDK:083N8282
21/2"	FDK:083N8287	FDK:083N8287	FDK:083N8285	FDK:083N8285
3"	FDK:083N8291	FDK:083N8292	FDK:083N8288	FDK:083N8289
4"	FDK:083N8118	FDK:083N8119	FDK:083N8116	FDK:083N8117
5"	FDK:083N8122	FDK:083N8123	FDK:083N8121	FDK:083N8122
6"	FDK:083N8126	FDK:083N8127	FDK:083N8125	FDK:083N8126
8"	FDK:083N8370	FDK:083N8133	FDK:083N8130	FDK:083N8370
10"	FDK:083N8140	FDK:083N8141	FDK:083N8137	FDK:083N8139
12"	FDK:083N8148	FDK:083N8149	FDK:083N8144	FDK:083N8146
14"	FDK:083N8157	FDK:083N8158	FDK:083N8152	FDK:083N8154
16"	FDK:083N8165	FDK:083N8166	FDK:083N8160	FDK:083N8165
18"	FDK:083N8173	FDK:083N8174	FDK:083N8169	FDK:083N8171
20"	FDK:083N8182	FDK:083N8183	FDK:083N8178	FDK:083N8180
24"	FDK:083N8190	FDK:083N8191	A5E32709738	A5E32710253

Protection of PTFE liner use 2 pcs. Grounding of PTFE lined flowmeter use 1 pc.

AS2129, Table E	
DN	Article No.
DN 15	FDK:083N8365
DN 25	FDK:083N8272
DN 40	FDK:083N8280
DN 50	FDK:083N8281
DN 65	FDK:083N8284
DN 80	FDK:083N8293
DN 100	FDK:083N8117
DN 125	FDK:083N8121
DN 150	FDK:083N8128
DN 200	FDK:083N8134
DN 250	FDK:083N8143
DN 300	FDK:083N8151
DN 350	FDK:083N8153
DN 400	FDK:083N8161
DN 450	FDK:083N8176
DN 500	FDK:083N8185
DN 600	A5E32710253

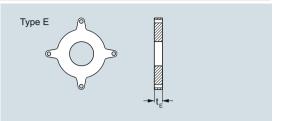
Protection of PTFE liner use 2 pcs. Grounding of PTFE lined flowmeter use 1 pcs.

### Flow sensor MAG 3100 and MAG 3100 HT

### Selection and Ordering data

MAG 3100 and MAG 3100 HT type E grounding and protecting ring

1 pc. Hastelloy C276 grounding and protection ring **type E** for PTFE liners incl. straps and screws

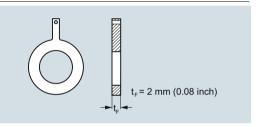


DN	PN 6	PN 16	PN 40	Size	ANSI Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			FDK:083N8487	1/2"	FDK:083N8487	FDK:083N8487
DN 25			FDK:083N8488	1"	FDK:083N8489	FDK:083N8489
DN 40			FDK:083N8490	11/2"	FDK:083N8491	FDK:083N8491
DN 50			FDK:083N8492	2"	FDK:083N8493	FDK:083N8493
DN 65	FDK:083N8494	FDK:083N8495	FDK:083N8496	21/2"	FDK:083N8497	FDK:083N8497
DN 80	FDK:083N8498	FDK:083N8499	FDK:083N8500	3"	FDK:083N8501	FDK:083N8502
DN 100	FDK:083N8503	FDK:083N8504	FDK:083N8505	4"	FDK:083N8506	FDK:083N8507

### Selection and Ordering data

MAG 3100 and MAG 3100 HT<sup>1)</sup> Grounding rings: Flat rings

1 pc. AISI 316 grounding flat ring for all liners (PTFE max. 130  $^{\circ}$ C (266  $^{\circ}$ F))



DN	PN 10	PN 16	PN 40	Size	ANSI	
					Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			A5E01191969	1/2"	A5E01191968	
DN 25			A5E01150880	1"	A5E01150022	A5E01150378
DN 40			A5E01191952	1½"	A5E01191961	
DN 50			A5E01150918	2"	A5E01151121	A5E01151194
DN 65		A5E01191940	A5E01191954	21/2"	A5E01191962	
DN 80		A5E01152876	A5E01152876	3"	A5E01152910	A5E01153422
DN 100		A5E01158875	A5E01159072	4"	A5E01159146	A5E01159628
DN 125		A5E01191941	A5E01191956	5"	A5E01191963	
DN 150		A5E01191943	A5E01191957	6"	A5E01191964	
DN 200	A5E01191951	A5E01191944	A5E01191958	8"	A5E01191965	
DN 250	A5E01191950	A5E01191946	A5E01191959	10"	A5E01191966	
DN 300	A5E01191949	A5E01191947	A5E01191960	12"	A5E01191967	

<sup>1)</sup> Also for MAG 5100 W (7ME6520 DN 40 ... 300)

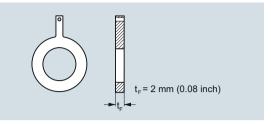
SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

### Selection and Ordering data

MAG 3100 and MAG 3100 HT Grounding rings : Flat rings

1 pc. **Hastelloy** C276 grounding **flat ring** for all liners (PTFE max. 130 °C (266 °F))

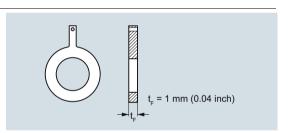


DN	PN 10	PN 16	PN 40	Size	ANSI	
					Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			A5E01191981	1/2"	A5E01191989	
DN 25			A5E01150882	1"	A5E01150028	A5E01150379
DN 40			A5E01191982	11/2"	A5E01191990	
DN 50			A5E01150922	2"	A5E01151124	A5E01151197
DN 65		A5E01191971	A5E01191983	21/2"	A5E01191991	
DN 80		A5E01152889	A5E01152889	3"	A5E01152913	A5E01153424
DN 100		A5E01158886	A5E01159074	4"	A5E01159150	A5E01159629
DN 125		A5E01191973	A5E01191984	5"	A5E01191992	
DN 150		A5E01191974	A5E01191985	6"	A5E01191993	
DN 200	A5E01191978	A5E01191975	A5E01191986	8"	A5E01191994	
DN 250	A5E01191979	A5E01191976	A5E01191987	10"	A5E01191995	
DN 300	A5E01191980	A5E01191977	A5E01191988	12"	A5E01191996	

### Selection and Ordering data

MAG 3100 and MAG 3100 HT Grounding rings : Flat rings

1 pc. **Tantalum** grounding **flat ring** for all liners (PTFE max. 130 °C (266 °F))

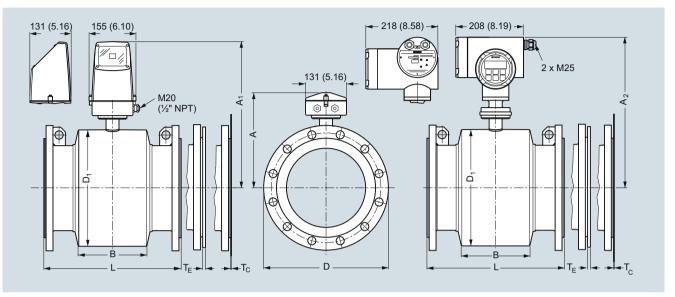


DN	PN 16	PN 40	Size	ANSI	
				Class 150	Class 300
	Article No.	Article No.		Article No.	Article No.
DN 15		A5E01192007	1/2"	A5E01192010	
DN 25		A5E01150883	1"	A5E01150030	A5E01150381
DN 40		A5E01192008	1½"	A5E01192011	
DN 50		A5E01150926	2"	A5E01151129	A5E01151199
DN 65	A5E01192005	A5E01192009	21/2"	A5E01192012	
DN 80	A5E01152890	A5E01152890	3"	A5E01152916	A5E01153427
DN 100	A5E01158891	A5E01159076	4"	A5E01159156	A5E01159631

Flow sensor MAG 3100 and MAG 3100 HT

### Dimensional drawings

### MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter



Dimensions in mm (inch)

### Metric

DN	A <sup>1)</sup>	A <sub>1</sub>	A <sub>2</sub>	В	D <sub>1</sub>	L <sup>2)</sup>							
		•	_			EN 1092-1	-201					ANSI 16	5.5
						PN 6, 10	PN 16/ PN 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
15	187	341	338	59	104	-	-	-	200	-	-	200	200
25	187	341	338	59	104	-	-	-	200	-	260	200	200
40	197	351	348	82	124	-	-	-	200	-	280	200	200
50	205	359	356	72	139	-	-	-	200	276	300	200	200
65	212	366	363	72	154	200	200/-	-	200	320	350	200	272
80	222	376	373	72	174	200	200/-	-	272 <sup>3)</sup>	323	340	272 <sup>3)</sup>	272 <sup>3)</sup>
100	242	396	393	85	214	250	250/-	-	250	380	400	250	310
125	255	409	406	85	239	250	250/-	-	250	420	450	250	335
150	276	430	427	85	282	300	300/-	-	300	415	450	300	300
200	304	458	455	137	338	350	350/-	350	350	480	530	350	350
250	332	486	483	157	393	450	450/-	450	450	550	620	450	450
300	357	511	508	157	444	500	500/-	500	500	600	680	500	500
350	362	516	513	270	451	550	550/-	550	550	-	-	550	550
400	387	541	538	270	502	600	600/-	600	600	-	-	600	600
450	418	572	569	310	563	600	600/-	600	600	-	-	600	640
500	443	597	594	350	614	600	600/-	625	680	-	-	600	730
600	494	648	645	320	715	600	600/-	750	800	-	-	600	860
700	544	698	695	450	816	700	875/700	800	-	-	-	800	-
750	571	725	722	556	869	-	-/-	-	-	-	-	950	-
800	606	760	757	560	927	800	1000/800	900	-	-	-	900	-
900	653	807	804	630	1032	900	1125/900	1000	-	-	-	1100	-
1000	704	858	855	670	1136	1000	1250/1000	1100	-	-	-	1100	-
1050	704	858	855	670	1136	-	-/-	-	-	-	-	-	-
1100	755	904	901	770	1238	-	-/-	-	-	-	-	-	-
1200	810	964	961	792	1348	1200	1500/1200	1300	-	-	-	1400	-
1400	925	1079	1076	1000	1574	1400	-/1400	-	-	-	-	-	-
1500	972	1126	1123	1020	1672	1500	-/1500	-	-	-	-	-	-
1600	1025	1179	1176	1130	1774	1600	-/1600	-	-	-	-	-	-
1800	1123	1277	1274	1250	1974	1800	-/1800	-	-	-	-	-	-
2000	1223	1377	1374	1375	2174	2000	-/2000	-	-	-	-	-	-

<sup>1) 14.5</sup> mm shorter with AISI terminal box (Ex and high temperature version)

<sup>2)</sup> When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length 3) Not according to ISO 13359

SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

DN	L <sup>1)</sup>				T <sub>C</sub> <sup>2)</sup>	T <sub>E</sub> <sup>2)</sup>	T <sub>F</sub> <sup>2)</sup>	T <sub>T</sub> <sup>2)</sup>	Wgt. <sup>3)</sup>
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20					
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	200	-	200	200	-	6	2	1	4
25	200	-	200	200	1.2	6	2	1	5
40	200	-	200	240	1.2	6	2	1	8
50	200	-	200	240	1.2	6	2	1	9
65	200	-	200	272	1.2	6	2	1	11
80	200 <sup>4)</sup>	-	200 <sup>8)</sup>	272 <sup>8)</sup>	1.2	6	2	1	12
100	250	-	250	310	1.2	6	2	1	16
125	250	-	250	335	1.2	6	2	-	19
150	300	-	300	300	1.2	6	2	-	27
200	350	-	350	350	1.2	8	2	-	40
250	450	-	450	450	1.2	8	2	-	60
300	500	-	500	500	1.6	8	2	-	80
350	550	-	550	550	1.6	8	-	-	110
400	600	-	600	600	1.6	10	-	-	125
450	600	-	600	640	1.6	10	-	-	175
500	600 <sup>5)</sup>	-	600	680	1.6	10	-	-	200
600	600 <sup>6)</sup>	-	600	800	1.6	10	-	-	287
700	700 <sup>7)</sup>	700	-	-	2.0	-	-	-	330
750	750 <sup>7)</sup>	750	-	-	2.0	-	-	-	360
800	800 <sup>7)</sup>	800	-	-	2.0	-	-	-	450
900	900 <sup>7)</sup>	900	-	-	2.0	-	-	-	530
1000	1000 <sup>7)</sup>	1000	-	-	2.0	-	-	-	660
1050	-	1050	-	-	2.0	-	-	-	660
1100	-	1100	-	-	2.0	-	-	-	1140
1200	1200 <sup>7)</sup>	1200	-	-	2.0	-	-	-	1180
1400	-	1400	-	-	2.0	-	-	-	1600
1500	-	1500	-	-	3.0	-	-	-	2460
1600	-	1600	-	-	3.0	-	-	-	2525
1800	-	1800	-	-	3.0	-	-	-	2930
2000	-	2000	-	-	3.0	-	-	-	3665

When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
 T<sub>C</sub> = Type C grounding ring, T<sub>E</sub> = Type E grounding ring (Included and factory mounted on high temperature 180 °C PTFE sensor), T<sub>F</sub> = Flat type grounding rings
 Weights are approx. (for PN 16) without transmitter
 PN 35 DN 80 = 272 mm (not according to ISO 13359)

<sup>5)</sup> PN 35 DN 80 = 272 mm (not.)
5) PN 35 DN 500 = 680 mm
6) PN 35 DN 600 = 750 mm
7) Not AS 4087 PN 21 or PN 35

<sup>8)</sup> Not according to ISO 13359

<sup>-</sup> not available

D = Outside diameter of flange, see flange tables

Flow sensor MAG 3100 and MAG 3100 HT

### MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter

Imperial

Size	A <sup>1)</sup>	A <sub>1</sub>	A <sub>2</sub>	В	D <sub>1</sub>	L <sup>2)</sup>								
						EN 1092-	1-201					ANSI 16	6.5/ASME	B16.47 <sup>3)</sup>
						PN 6, 10	PN 16/ PN 16 non PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300	Class 600
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
1/2	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	-	7.87	7.87	-
1	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	10.24	7.87	7.87	11.02
1½	7.76	13.70	13.64	3.23	4.88	-	-	-	7.87	-	11.02	7.87	7.87	12.60
2	8.07	14.01	13.95	2.83	5.47	-	-	-	7.87	10.87	11.81	7.87	7.87	12.99
21/2	8.35	14.29	14.23	2.83	6.06	7.87	7.87/-	-	7.87	12.60	13.78	7.87	10.71	on reques
3	8.74	14.69	14.63	2.83	6.85	7.87	7.87/-	-	10.71 <sup>4)</sup>	12.72	13.39	10.71 <sup>4)</sup>	10.71 <sup>4)</sup>	13.78
4	9.53	15.47	15.41	3.35	8.43	9.84	9.84/-	-	9.84	14.96	-	9.84	12.20	18.11
5	10.04	15.98	15.92	3.35	9.41	9.84	9.84/-	-	9.84	16.54	-	9.84	13.10	18.90
6	10.87	16.81	16.75	5.39	11.10	11.81	11.81/-	-	11.81	16.34	-	11.81	11.81	19.68
8	11.97	17.91	17.85	5.39	13.31	13.78	13.78/-	13.78	13.78	18.90	-	13.78	13.78	23.62
10	13.07	19.02	18.96	6.18	15.47	17.72	17.72/-	17.72	17.72	-	-	17.72	17.72	23.62
12	14.05	20.00	19.94	6.18	17.48	19.69	19.69/-	19.69	19.69	-	-	19.69	19.69	27.56
14	14.25	20.20	20.14	10.63	17.76	21.65	21.65/-	21.65	21.65	-	-	21.65	21.65	-
16	15.24	21.18	21.12	10.63	19.76	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
18	16.45	22.40	22.34	12.20	22.16	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
20	17.44	23.39	23.33	13.78	24.17	23.62	23.62/-	24.61	26.77	-	-	23.62	28.70	-
24	19.45	25.39	25.33	12.59	28.15	23.62	23.62/-	29.53	31.50	-	-	23.62	33.80	-
28	21.42	27.36	27.30	17.72	32.13	27.56	34.45/27.56	31.50	-	-	-	31.50	-	-
30	22.48	28.43	28.37	21.89	34.21	-	-/-	-	-	-	-	37.41	-	-
32	23.86	29.80	29.74	22.05	36.50	31.50	39.37/31.50	35.44	-	-	-	35.44	-	-
36	25.71	31.65	31.59	24.80	40.63	35.43	44.29/35.43	39.38	-	-	-	43.32	-	-
40	27.72	33.85	33.79	26.38	44.72	39.37	49.21/39.37	43.32	-	-	-	43.32	-	-
42	27.72	33.85	33.79	26.38	44.72	-	-/-	-	-	-	-	-	-	-
44	29.72	35.67	35.61	30.31	48.74	-	-/-	-	-	-	-	-	-	-
48	31.89	37.83	37.77	31.18	53.07	47.24	59.06/47.24	51.19	-	-	-	55.12	-	-
54	36.42	42.36	42.30	39.37	61.97	55.12	-/55.12	-	-	-	-	-	-	-
60	38.27	44.21	44.15	40.15	65.83	59.06	59.06/59.06	-	-	-	-	-	-	-
66	40.35	46.30	46.24	44.49	69.84	62.99	-/62.99	-	-	-	-	-	-	-
72	44.21	50.16	50.10	49.21	77.72	70.87	-/70.87	-	-	-	-	-	-	-
78	48.15	54.09	54.03	54.13	85.59	78.74	-/78.74	_	-	_	-	-	-	-

 <sup>0.571</sup> inch shorter with AISI terminal box (Ex and high temperature version)
 When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
 ANSI 16.5 for DN ≤ 24"; ASME B16.47 for DN ≥ 28"
 Not according to ISO 13359

SITRANS F M

### Flow sensor MAG 3100 and MAG 3100 HT

Size	L <sup>1)</sup>				T <sub>C</sub> <sup>2)</sup>	T <sub>E</sub> <sup>2)</sup>	T <sub>F</sub> <sup>2)</sup>	T <sub>T</sub> <sup>2)</sup>	Weight <sup>3)</sup>
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20					
[in.]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
1/2	7.87	-	7.87	7.87	-	0.24	0.08	0.04	9
1	7.87	-	7.87	7.87	0.05	0.24	0.08	0.04	11
1½	7.87	-	7.87	9.44	0.05	0.24	0.08	0.04	17
2	7.87	-	7.87	9.44	0.05	0.24	0.08	0.04	20
21/2	7.87	-	7.87	10.70	0.05	0.24	0.08	0.04	24
3	7.87 <sup>4)</sup>	-	7.87 <sup>8)</sup>	10.70 <sup>8)</sup>	0.05	0.24	0.08	0.04	26
4	9.84	-	9.84	12.20	0.05	0.24	0.08	0.04	35
5	9.84	-	9.84	13.18	0.05	0.24	0.08	-	42
6	11.81	-	11.81	11.81	0.05	0.24	0.08	-	60
8	13.78	-	13.77	13.77	0.05	0.31	0.08	-	88
10	17.72	-	17.71	17.71	0.05	0.31	0.08	-	132
12	19.69	-	19.68	19.68	0.06	0.31	0.08	-	176
14	21.65	-	21.65	21.65	0.06	0.31	-	-	242
16	23.62	-	23.62	23.62	0.06	0.39	-	-	275
18	23.62	-	23.62	25.19	0.06	0.39	-	-	385
20	23.62 <sup>5)</sup>	-	23.62	26.77	0.06	0.39	-	-	440
24	23.62 <sup>6)</sup>	-	23.62	31.49	0.06	0.39	-	-	633
28	27.56 <sup>7)</sup>	27.56	-	-	0.08	-	-	-	728
30	29.53 <sup>7)</sup>	29.52	-	-	0.08	-	-	-	794
32	31.50 <sup>7)</sup>	31.50	-	-	0.08	-	-	-	992
36	35.43 <sup>7)</sup>	35.43	-	-	0.08	-	-	-	1168
40	39.37 <sup>7)</sup>	39.37	-	-	0.08	-	-	-	1455
42	-	39.37	-	-	0.08	-	-	-	1455
44	-	43.31	-	-	0.08	-	-	-	2513
48	47.24 <sup>7)</sup>	47.24	-	-	0.08	-	-	-	2601
54	-	55.12	-	-	0.12	-	-	-	3528
60	-	59.06	-	-	0.12	-	-	-	5423
66	-	63.00	-	-	0.12	-	-	-	5566
72	-	70.87	-	-	0.12	-	-	-	6460
78	-	78.74	-	-	0.12	-	-	-	8080

When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length

T<sub>C</sub> = Type C grounding ring, T<sub>E</sub> = Type E grounding ring (Included and factory mounted on high temperature 356 °F PTFE sensor),
T<sub>F</sub> = Flat type grounding rings

Weights are for ANSI 150 without transmitter
PN 35 DN 80 = 10.70 inch
PN 35 DN 500 = 26.77 inch

<sup>6)</sup> PN 35 DN 600 = 29.53 inch

<sup>7)</sup> Not AS 4087 PN 21 or PN 35

<sup>8)</sup> Not according to ISO 13359

<sup>-</sup> not available

D = Outside diameter of flange, see flange tables

Flow sensor MAG 3100 P

### Overview



The SITRANS F M MAG 3100 P is designed to meet the most common specifications within chemical and process industries.

#### Benefits

- DN 15 to DN 300 (1/2" to 12")
- Included in Quick Ship Program (delivery time see PIA LCP)
- Most used flowmeter in the chemical and process industries with PTFE/PFA liner and Hastelloy electrodes
- · Excellent chemical resistance
- Full scope of global approvals for hazardous areas:
  - ATEX, FM, CSA, IEcEx
  - 24 V and 115/230 V Ex compact and remote
  - intrinsically safe ia analog output
- Comprehensive self-diagnostic for error indication and error logging
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- MAG 6000 I full NAMUR compliance
  - compliant with NE 21, NE 32, NE 43, NE 53 and NE 70

### Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Chemical industry
- Process industry
- · Pulp and paper
- · Industrial waste water

#### Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- High temperature sensor for applications with temperatures up to 150 °C (302 °F)
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges, and CRN
- Build-in length according to ISO 13359
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

### Mode of operation

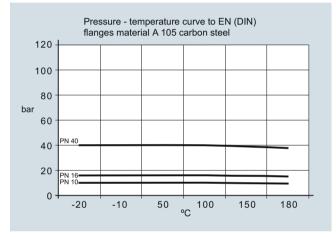
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

#### Integration

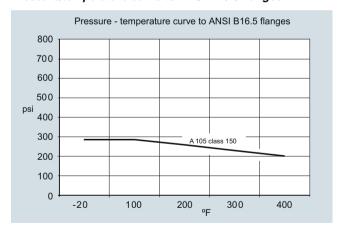
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

## Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel



#### Pressure/temperature curve to ANSI B16.5 flanges



**Note:** The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

### SITRANS F M

### Flow sensor MAG 3100 P

Flow sensor MAG 3100 P			
Technical specifications			
Product characteristic	Chemical and process industry-	Design	
	oriented (Included in Quick Ship Program (delivery time see PIA	Weight	See dimensional drawings
Nominal size	LCP)) • PTFE: DN 15 300 (½" 12")	Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant two component
	• PFA: DN 15 150 (½" 6")		epoxy coating (min. 150 μm)
Measuring principle	Electromagnetic induction	Measuring pipe material	AISI 304/1.4301
Excitation frequency (Mains supply: 50 Hz/60 Hz)	• DN 15 65 (½" 2½"): 12.5 Hz/15 Hz	Electrode material	PTFE: Hastelloy C276/2.4819 PFA: Hastelloy C22/2.4602
	• DN 80 150 (3" 6"): 6.25 Hz/7.5 Hz	Grounding electrode material	PTFE: No grounding electrodes PFA: Hastelloy
	• DN 200 300 (8" 12"): 3.125 Hz/3.75 Hz	Terminal box (remote version only)	<ul> <li>Standard fibre glass reinforced polyamide</li> </ul>
Process connection	Th. (200 ( ) ( ) ( ) ( )		Option Stainless steel     AICLA 4420
Flanges	EN 1092-1, raised face <sup>1)</sup> (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions)		AISI 316/1.4436  Ex sensor: Stainless steel AISI 316/1.4436
	• DN 15 50 (½" 2"): PN 40 (580 psi)	Cable entries	• Remote installation 2 x M20 or 2 x ½" NPT
	<ul> <li>DN 65 300 (2½" 12"): PN 16 (232 psi)</li> <li>DN 200 300 (8" 12"):</li> </ul>		Compact installation     MAG 5000/MAG 6000: 4 x M20
	PN 10 (145 psi) ANSI B16.5 (~BS 1560), raised		or 4 x ½" NPT - MAG 6000 I: 2 x M25 or
	face		2 x ½" NPT
	• ½" 12": Class 150 (20 bar (290 psi))		(for supply/output)  - MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output)
Rated operation conditions		Certificates and approvals	
Ambient temperature (conditions also dependent on liner characteristiques)		Calibration	7
Standard sensor	-40 +100 °C (-40 +212 °F)	Standard production calibration, calibration report shipped with	Zero-point, 2 x 25 % and 2 x 90 %
• Ex sensor	-20 +60 °C (-4 +140 °F)	sensor	
With compact transmitter		Conforms to	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC <sup>3)</sup>
- MAG 5000/6000 <sup>2)</sup>	-20 +60 °C (-4 +140 °F)		CRN
- MAG 6000 I	-20 +60 °C (-4 +140 °F)	Material certificate EN 10204 3.1	Available when ordering together
- MAG 6000 I Ex	-20 +60 °C (-4 +140 °F)		with meter <sup>4)</sup>
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operat-	• PTFE Teflon - DN 15 300 (½" 12") : 0.3 40 bar (4 580 psi)	Ex approvals	<ul><li>ATEX 2G D: DN 15 300:</li><li>EEx de ia IIC T3 - T6</li></ul>
ing temperature and with stainless			• IEC Ex de ia IIC T3-T6
steel flanges)	- DN 15 150 (½" 6"): Vacuum 0.02 50 bar (0.29 725 psi)		• FM Class I/II/III, Div 1 (compact only)
Enclosure rating	IP67 to EN 60529/NEMA 4X/6,		• FM Class I, Zone 1/21
G	1 mH <sub>2</sub> O for 30 min		CSA Class I, Zone 1/21 Standard sensor
	Option: IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont. (not for Ex)		• FM Class I, Div 2
Pressure drop at 3 m/s	As straigth pipe	Overta de transfer (OT)	• CSA Class I, Div 2
Test pressure	1.5 x PN (where applicable)	Custody transfer (CT) (only together with MAG 5000/	Hot water pattern approval - PTB (Germany)
Mechanical load (vibration)	<ul> <li>18 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36</li> </ul>	6000 CT), order as special	Other media than water - OIML R 117 (Denmark)
	• Sensor: 3.17 g RMS	<ul> <li>DN ≤ 600 type 01 (SORF); DN &gt; 6</li> <li>With compact transmitter MAG 50</li> </ul>	00 type 11 (WNRF)
	<ul> <li>Sensor with compact MAG 5000/ 6000 mounted transmitter:</li> <li>3.17 g RMS</li> </ul>	(-4 +122 °F)	standard and requirements, see page
	Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS	4)	It is not possible to order the certificate
Temperature of medium	• PTFE -20 +130 °C (-4 +266 °F)		
<b>5</b> 110	• PFA -20 +150 °C (-4 +302 °F)		
EMC	2004/100/LC		

EMC

2004/108/EC

### Flow sensor MAG 3100 P

Selection and Ordering data		Arti	cle	N	Э.		
Sensor SITRANS F M MAG 3100 P		7 M	E 6	3	4 0	-	
(Short delivery time)							
∠ Click on the Article No. for the online configu- ration in the PIA Life Cycle Portal.		r	۲		-	۱	•
Diameter							+
DN 15 (½")	•	1 V					
DN 25 (1")	-	2 D					
* *	-	2 R					
DN 40 (1½")							
DN 50 (2")	<b>1</b> )	2 Y					
DN 65 (2½")	_	٠.					
DN 80 (3")		3 M					
DN 100 (4")		3 T					
DN 125 (5")		4 B					
DN 150 (6")		4 H					
DN 200 (8")		4 P					
DN 250 (10")		4 V					
DN 300 (12")		5 D					
Flange norm and pressure rating							
EN 1092-1							
PN 10 (DN 200 300 (8" 12"))			В				
PN 16 (DN 65 300 (2½" 12"))			С				
PN 40 (DN 15 50 (½" 2")			F				
ANSI B16.5							
Class 150 (1/2" 12")			J				
Flange material							
Carbon steel flanges ASTM A 105			1				
Liner material							
PTFE (130 °C (266 °F))				3			
PFA (150 °C (302 °F)) (DN 15 150 (½" 6"))				7			
Electrode material							
Hastelloy C	•				2		
Hastelloy C incl. grounding electrode, (only PFA)					6		
Transmitter							
Standard sensor for remote transmitter (Order	•					Α	
transmitter separately)						``	
Ex sensor for remote transmitter (Order transmit-						В	
ter separately)							
MAG 6000 I, Aluminum, 18 90 V DC, 115 230 V AC						С	
MAG 6000 I, Aluminum, 18 30 V DC, Ex	•					D	
MAG 6000 I, Aluminum, 115 230 V AC, Ex	-					E	
MAG 6000 I (NAMUR), Aluminum, 18 30 V DC,	_					F	
115 230 V AC						•	
MAG 6000 I (NAMUR), Aluminum, 18 30 V DC,						G	
115 230 V`AC, Ex							
MAG 6000, Polyamide, 11 30 V DC/11 24 V AC						Н	
MAG 6000, Polyamide, 115 230 V AC						J	
MAG 5000, Polyamide, 11 30 V DC/11 24 V AC						K	
MAG 5000, Polyamide, 115 230 V AC						L	
Communication							
No communication, add-on possible						Α	
HART						В	
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)						F	
PROFIBUS DP Profile 3 (not for Ex)						G	
(only MAG 6000/MAG 6000 I)							
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)						Ε	
FOUNDATION Fieldbus H1	•					J	
(only MAG 6000/MAG 6000 I)	_					ľ	
Cable glands/terminal box							
Metric: Polyamide terminal box or 6000 I compact							1
1/2" NPT: Polyamide terminal box or 6000 I compact							2
Metric SS terminal box (mandatory for stainless							3
steel MAG 6000 transmitter)							
1/2" NPT SS terminal box (mandatory for stainless							4
steel MAG 6000 transmitter)							

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	C12 <sup>1)</sup>
Factory certificate according to EN 10204-2.1	C15
Factory certificate according to EN 10204-2.2	C14
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific converter setup	Y20
Power cable wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box IP68 with wired cable (specify cable Article No.) (not for ATEX)	Y41
Other postproduction requirements (add desired text)	Y99
Additional calibrations	
Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request <sup>2)</sup>
<ul> <li>Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005</li> </ul>	On request <sup>2)</sup>
<ul> <li>Customer-specified calibration up to 10 points</li> </ul>	On request <sup>2)</sup>
<ul> <li>CT verification and authority seal according to: PTB (Denmark and Germany)</li> </ul>	On request <sup>2)</sup>
<ul> <li>Customer-witnessed calibration</li> <li>Any of above calibration</li> </ul>	On request <sup>2)</sup>

<sup>1)</sup> Under preparation.

### Operating instructions for SITRANS F M MAG 3100 P

Description	Article No.	
• English	A5E03005599	
<ul> <li>German</li> </ul>	A5E03086288	
<ul> <li>Spanish</li> </ul>	A5E03086291	
• French	A5E03086290	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I ATEX 2G D transmitters and sensors are delivered compact mounted from factory.

Communication module will be pre-mounted in the transmitter.

#### Accessories

Description		Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	•	FDK:085U0220	The state of the s

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

<sup>1)</sup> Only for ANSI flanges

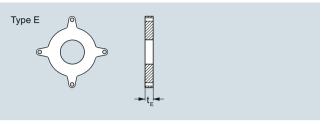
SITRANS F M

### Flow sensor MAG 3100 P

### Selection and Ordering data

MAG 3100 P Type E grounding and protection ring

1 pc. AISI 316 grounding and protection rings  $\mbox{type}\ \mbox{E}$  for PTFE liners incl. straps and screws



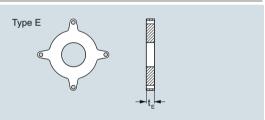
DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	ANSI <sup>1)</sup>	Class 150 Article No.
DN 15 DN 25 DN 40			FDK:083N8365 FDK:083N8271 FDK:083N8278	½" 1" 1½"	FDK:083N8365 FDK:083N8272 FDK:083N8279
DN 50 DN 65 DN 80		FDK:083N8285 FDK:083N8289	FDK:083N8282	2" 2½" 3"	FDK:083N8283 FDK:083N8287 FDK:083N8291
DN 100 DN 125 DN 150		FDK:083N8117 FDK:083N8121 FDK:083N8125		4" 5" 6"	FDK:083N8118 FDK:083N8122 FDK:083N8126
DN 200 DN 250 DN 300	FDK:083N8130 FDK:083N8136 FDK:083N8144	FDK:083N8130 FDK:083N8137 FDK:083N8145		8" 10" 12"	FDK:083N8370 FDK:083N8140 FDK:083N8148

Protection of PTFE liner use 2 pcs. Earthing of PTFE lined flowmeter use 1 pc.

### Selection and Ordering data

MAG 3100 P type E grounding and protecting ring

1 pc.  ${f Hastelloy}$  C276 grounding and protection ring  ${f type}$   ${f E}$  for PTFE liners incl. straps and screws



DN	PN 16	PN 40	Size	ANSI <sup>1)</sup> Class 150	
	Article No.	Article No.		Article No.	
DN 15		FDK:083N8487	1/2"	FDK:083N8487	
DN 25		FDK:083N8488	1"	FDK:083N8489	
DN 40		FDK:083N8490	11/2"	FDK:083N8491	
DN 50		FDK:083N8492	2"	FDK:083N8493	
DN 65	FDK:083N8495		21/2"	FDK:083N8497	
DN 80	FDK:083N8499		3"	FDK:083N8501	
DN 100	FDK:083N8504		4"	FDK:083N8506	

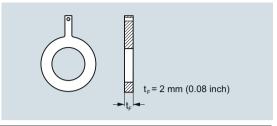
 $<sup>^{\</sup>rm 1)}~{\rm For~dimensions~of~MAG~3100~P}$  see table on page 3/90  $^{\rm 1}$ 

Flow sensor MAG 3100 P

### Selection and Ordering data

MAG 3100 P Grounding rings: Flat rings

1 pc. AISI 316 grounding flat ring for all liners

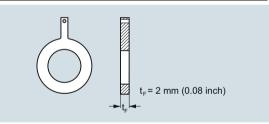


DN	PN 10	PN 16	PN 40	Size	ANSI <sup>1)</sup>	
					Class 150	
	Article No.	Article No.	Article No.		Article No.	
DN 15			A5E01191968	1/2"	A5E01191969	
DN 25			A5E01150880	1"	A5E01150022	
DN 40			A5E01191952	11/2"	A5E01191961	
DN 50			A5E01150918	2"	A5E01151121	
DN 65		A5E01191940		21/2"	A5E01191962	
DN 80		A5E01152876		3"	A5E01152910	
DN 100		A5E01158875		4"	A5E01159146	
DN 125		A5E01191941		5"	A5E01191963	
DN 150		A5E01191943		6"	A5E01191964	
DN 200	A5E01191951	A5E01191944		8"	A5E01191965	
DN 250	A5E01191950	A5E01191946		10"	A5E01191966	
DN 300	A5E01191949	A5E01191947		12"	A5E01191967	

### Selection and Ordering data

MAG 3100 P Grounding rings : Flat rings

1 pc. Hastelloy C276 grounding flat ring



DN	PN 10	PN 16	PN 40	Size	ANSI <sup>1)</sup> Class 150	
	Article No.	Article No.	Article No.		Article No.	
DN 15			A5E01191981	1/2"	A5E01191989	
DN 25			A5E01150882	1"	A5E01150028	
DN 40			A5E01191982	11/2"	A5E01191990	
DN 50			A5E01150922	2"	A5E01151124	
DN 65		A5E01191971		21/2"	A5E01191991	
DN 80		A5E01152889		3"	A5E01152913	
DN 100		A5E01158886		4"	A5E01159150	
DN 125		A5E01191973		5"	A5E01191992	
DN 150		A5E01191974		6"	A5E01191993	
DN 200	A5E01191978	A5E01191975		8"	A5E01191994	
DN 250	A5E01191979	A5E01191976		10"	A5E01191995	
DN 300	A5E01191980	A5E01191977		12"	A5E01191996	

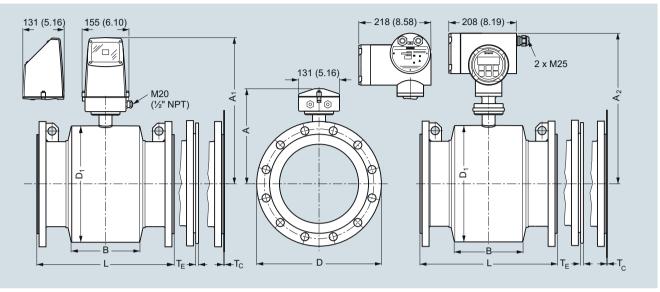
 $<sup>^{\</sup>rm 1)}~{\rm For~dimensions~of~MAG~3100~P~see~table~on~page~3/90}$ 

SITRANS F M

### Flow sensor MAG 3100 P

### Dimensional drawings

### MAG 3100 P sensor with compact or remote transmitter



Dimensions in mm (inch)

### Metric

DN	A <sup>1)</sup>	A <sub>1</sub>	A <sub>2</sub>	В	D <sub>1</sub>	L <sup>2)</sup>				T <sub>E</sub> <sup>3)</sup>	T <sub>F</sub> <sup>3)</sup>	Wgt. <sup>4)</sup>
						EN 1092-	1-201		ANSI 16.5			
						PN 10	PN 16	PN 40	Class 150			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	187	341	338	59	104	-	-	200	200	6	2	4
25	187	341	338	59	104	-	-	200	200	6	2	5
40	197	351	348	82	124	-	-	200	200	6	2	8
50	205	359	356	72	139	-	-	200	200	6	2	9
65	212	369	366	72	154	-	200/-	-	200	6	2	11
80	222	376	373	72	174	-	200/-	-	272 <sup>5)</sup>	6	2	12
100	242	396	393	85	214	-	250/-	-	250	6	2	16
125	255	409	406	85	239	-	250/-	-	250	6	2	19
150	276	430	427	85	282	-	300/-	-	300	6	2	27
200	304	458	455	137	338	350	350/-	-	350	8	2	40
250	332	486	483	157	393	450	450/-	-	450	8	2	60
300	357	511	508	157	444	500	500/-	-	500	8	2	80

<sup>1) 14.5</sup> mm shorter with AISI terminal box (Ex and high temperature version)

When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
 T<sub>E</sub> = Type E grounding ring, T<sub>F</sub> = Flat type grounding rings
 Weights are approx. (for PN 16) without transmitter
 Not according to ISO 13359

<sup>-</sup> not available

D = Outside diameter of flange, see flange tables

Flow sensor MAG 3100 P

#### MAG 3100 P sensor with compact or remote transmitter

#### Imperial

Size	A <sup>1)</sup>	A <sub>1</sub>	A <sub>2</sub>	В	D <sub>1</sub>	L <sup>2)</sup>				T <sub>C</sub> <sup>3)</sup>	T <sub>E</sub> <sup>3)</sup>	T <sub>F</sub> <sup>3)</sup>	Wgt.4)
						EN 1092	-1-201		ANSI 16.5				
						PN 10	PN 16	PN 40	Class 150				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
1/2	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	-	0.24	0.08	9
1	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.05	0.24	0.08	11
1½	7.76	13.8	13.74	3.23	4.88	-	-	7.87	7.87	0.05	0.24	0.08	17
2	8.07	14.1	14.04	2.83	5.47	-	-	7.87	7.87	0.05	0.24	0.08	20
21/2	8.35	14.4	14.34	2.83	6.06	-	7.87/-	-	7.87	0.05	0.24	0.08	24
3	8.74	14.8	14.74	2.83	6.85	-	7.87/-	-	10.71 <sup>5)</sup>	0.05	0.24	0.08	26
4	9.53	15.6	15.54	3.35	8.43	-	9.84/-	-	9.84	0.05	0.24	0.08	35
5	10.04	16.1	16.04	3.35	9.41	-	9.84/-	-	9.84	0.05	0.24	0.08	42
6	10.87	16.9	16.84	3.35	11.10	-	11.81/-	-	11.81	0.05	0.24	0.08	60
8	11.97	18.0	17.94	5.39	13.31	13.78	13.78/-	-	13.78	0.05	0.31	0.08	88
10	13.07	19.1	19.04	6.18	15.47	17.72	17.72/-	-	17.72	0.05	0.31	0.08	132
12	14.05	20.1	20.04	6.18	17.48	19.69	19.69/-	-	19.69	0.06	0.31	0.08	176

<sup>1) 0.571</sup> inch shorter with AISI terminal box (Ex and high temperature version)
2) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
3) T<sub>C</sub> = Type C grounding ring, T<sub>E</sub> = Type E grounding ring, T<sub>F</sub> = Flat type grounding rings
4) Weights are for ANSI 150 without transmitter
5) Not according to ISO 13359

<sup>-</sup> not available

D = Outside diameter of flange, see flange tables

SITRANS F M

#### Flow sensor MAG 5100 W

#### Overview



The SITRANS F M MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, waste water, sewage or sludge applications.

#### Benefits

- DN 15 to DN 1200 / 2000 (1/2" to 48"/78")
- Stock program of MAG 5100 W secures short delivery time
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA, AS and JIS.
- NBR Hard Rubber and Ebonite Hard Rubber liner for all water applications
- · EPDM liner with drinking water approvals
- · Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design (Article No. 7ME6520, DN 15 to 300 mm (½" to 12")).
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals
- Build-in length according to ISO 13359; the standard includes sizes up to DN 400.
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings.
- Designed so patented in-situ verification can be conducted. Using SENSORPROM fingerprint.
- Custody Transfer option for water billing, with type approval after OIML R 49 and verified according to MI-001 0D inlet/ 0D outlet installation
  - pattern approval OIML R 49 (Denmark, Germany)
  - conforms to ISO 4064 and EN 14154 for mechanical flowmeters PTR K7 2
- FM Fire Service Meter (Class Number 1044) for automatic fire protection systems
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor
- · MCERTS approval for UK environmental market

#### Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- · Water treatment
- Water distribution network (leak detection management)
- · Custody transfer water meters
- Irrigation
- · Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra filtration)
- Industrial water applications

#### Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

#### Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, DeviceNet, PROFIBUS DP and PA, FOUNDATION Fieldbus H1 or Modbus RTU/RS 485.

Flow sensor MAG 5100 W

<b>Technical</b>	s	pe	cifi	ca	tic	ons
. commou	•	ρυ,	····	vu		,,,,

Product characteristic	MAG 5100 W (7ME6520) Mainly for the European market	MAG 5100 W (7ME6580) Mainly for the non-European market				
	EPDM or NBR lining	Ebonite lining				
Design and nominal size	Coned sensor (octagon liner): DN 15 40 (½" 1½") Coned sensor: DN 50 300 (2" 12") Full bore sensor: DN 350 1200 (14" 48")	Full bore sensor: DN 25 2000 (1" 78")				
Measuring principle	Electromagnetic induction	Electromagnetic induction				
Excitation frequency (Mains supply: 50/60 Hz)	DN 15 65 (½" 2½"): 12.5 Hz/15 Hz DN 80 150 (3" 6"): 6.25 Hz/7.5 Hz DN 200 300 (8" 12"): 3.125 Hz/3.75 Hz DN 350 1200 (14" 48"): 1.5625 Hz/1.875 Hz	DN 25 65 (1" 2½"): 12.5 Hz/15 Hz DN 80 150 (3" 6"): 6.25 Hz/7.5 Hz DN 200 1200 (8" 48"): 3.125 Hz/3.75 Hz DN 1400 2000 (54" 78"): 1.5625 Hz/1.875 Hz				
Process connection						
Flanges <sup>1)</sup>						
• EN 1092-1	PN 10 (145 psi): DN 200 300 (8" 12") Flat face PN 10 (145 psi): DN 350 1200 (14" 48") Raised face <sup>2)</sup> PN 16 (232 psi): DN 50 300 (2" 12") Flat face <sup>3)</sup> PN 16 (232 psi): DN 350 1200 (14" 48") Raised face PN 40 (580 psi): DN 15 40 (½" 1½") Flat face	Raised face <sup>3)</sup> (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) PN 6 (87 psi): DN 1400 2000 (54" 78") PN 10 (145 psi): DN 200 2000 (8" 78") PN 16 (232 psi): DN 65 600 (2½" 24") PN 40 (580 psi): DN 25 50 (1" 2")				
• ANSI B16.5	Class 150: ½" 12" flat face; 14" 24" raised face	Class 150: 1" 24"; raised face				
• AWWA C-207	Class D: 28" 48", flat face	Class D: 28" 78", flat face				
• AS4087	PN 16 (DN 50 1200), (2" 48") 16 bar (232 psi)	PN 16 (DN 50 1200), (2" 48") 16 bar (232 psi)				
• JIS B 2220:2004	-	K10 (1" 24")				
Rated Operation conditions						
Ambient temperature						
• Sensor	-40 +70 °C (-40 +158 °F)	-20 +70 °C (-4 +158 °F)				
With compact transmitter MAG 5000/6000 <sup>4)</sup>	-20 +60 °C (-4 +140 °F)	-20 +60 °C (-4 +140 °F)				
Operating pressure (Abs) [abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature)	DN 15 40 (½" 1½"): 0.01 40 bar (0.15 580 psi) DN 50 300 (2" 12"): 0.03 20 bar (0.44 290 psi) DN 350 1200 (14" 48"): 0.01 16 bar (0.15 232 psi)	DN 25 50 (1" 2"): 0.01 40 bar (0.15 580 psi) DN 65 1200 (2½" 48"): 0.01 16 bar (0.15 232 psi) DN 1400 2000 (54" 78"): 0.01 10 bar (0.15 145 psi)				
Enclosure rating						
• Standard	IP67 to EN 60529/NEMA 4X/6 (1 mH <sub>2</sub> O for 30 min)	IP67 to EN 60529/NEMA 4X/6 (1 mH <sub>2</sub> O for 30 min)				
• Option	IP68 to EN 60529/NEMA 6P (10 mH <sub>2</sub> O continuously)	IP68 to EN 60529/NEMA 6P (10 mH <sub>2</sub> O continuously)				
Pressure drop	DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s).   DN 40 300 ( $1\frac{1}{2}$ " 12"): Max 25 mbar (0.36 psi) at 3 m/s (10 ft/s)	Insignificant				
Test pressure	DN 350 1200 (14" 48"): Insignificant 1.5 x PN (where applicable) FM Fire Service: 2 x PN	1.5 x PN (where applicable)				
Mechanical load (vibration)	18 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS	18 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS				

#### SITRANS F M

## Flow sensor MAG 5100 W

Product characteristic	Mainly for the European market (7ME6520)	Mainly for the non-European market (7ME6580)
	EPDM or NBR lining	Ebonite lining
Medium conditions		
Temperature of medium		
• NBR	-10 +70 °C (14 158 °F)	-
• EPDM	-10 +70 °C (14 158 °F)	-
• EPDM/NBR (MI-001)	0.1 30 °C (32 76 °F)	-
• Ebonite	-	-10 +70 °C (14 158 °F)
EMC	2004/108/EC	2004/108/EC
Design		
Material		
Housing and flanges	Carbon steel ASTM A 105, with corrosion-resistant two-component epoxy coating (150 μm/300 μm) Corrosivity category C4, according to ISO 12944-2	Carbon steel ASTM A 105, with corrosion- resistant two-component epoxy coating (150 μm/300 μm) Corrosivity category C4, according to ISO 12944-2
Measuring pipe	Stainless steel AISI 304/1.4301	Stainless steel AISI 304/1.4301
• Electrode	Hastelloy C	Hastelloy C
Grounding electrode	Hastelloy C	Hastelloy C
Terminal box	Fibre glass reinforced polyamide	Fibre glass reinforced polyamide
Certificates and approvals		
Calibration		
<ul> <li>Standard production calibration (default), calibration report shipped with sensor</li> </ul>	Zero-point, 2 x 25 % and 2 x 90 %	Zero-point, 2 x 25 % and 2 x 90 %
Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory $\mathbf{Q}_{\text{max}}$	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q <sub>max</sub>
	20 %, 40 %, 60 %, 80 %, 100 % of factory Q <sub>max</sub>	10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $\rm Q_{max}$
	Matched-pair calibration: default, 5-point or 10-point	Matched-pair calibration: default, 5-point or 10-point
Material certificate EN 10204 3.1	Available when ordering together with meter <sup>5)</sup>	Available when ordering together with meter <sup>5)</sup>
Custody Transfer (only together with MAG 6000 CT)	OIML R 49 pattern approval cold water (Denmark and Germany): DN 50 300 (2" 12")	
	MI-001 cold water (EU): DN 50 300 (2" 12")	
	PTB K7.2: Chilled water energy metering DN 50-300 (order as special) Certificate number: 22 76.10 02	
Drinking water approvals	EPDM liner: NSF/ANSI Standard 61 <sup>6)</sup> (Cold water, US) WRAS (WRc, BS6920 cold water, GB) ACS (F), DVGW W270 (D) Belgaqua (B)	NSF/ANSI Standard 61 <sup>6)</sup> (Cold water, US) WRAS (WRc, BS6920 cold water, GB)
Other approvals	MCERTS	
	PED conforming: All EN1092-1 flanges and ANSI Class 150 (< DN 300 (<12")) – 97/23/EC <sup>7)</sup>	PED conforming: All EN1092-1 flanges (≤ DN 600 (≤ 24") – 97/23/EC <sup>7</sup> )
	CRN (DN 50 - DN 1200 (2" 48"))	CRN
	CSA Class I, Div 2 <sup>8)</sup>	CSA Class I, Div 2 <sup>8</sup> )
	FM Class I, Div 2 <sup>8)</sup> FM Fire Service Approval according to class	FM Class I, Div 2 <sup>8)</sup>
	1044 <sup>8)9)</sup>	
	VdS: Extinguishing systems DN 50 300	

<sup>1)</sup> DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS4087 flanges

<sup>2)</sup> Type 01 (SORF)

<sup>3)</sup> DN  $\leq$  600 type 01 (SORF); DN > 600 type 11

<sup>4)</sup> With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F); with compact MI-001 approved transmitter -25 ... +55 °C (-13 ... +131 °F)

<sup>5)</sup> Has to be ordered with the meter. It is not possible to order the certificate afterwards.

Including Annex G

For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the directive, also products sold into certain market sectors are excluded. These include:
a) Meters used in networks for the supply, distribution and discharge of water.
b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
c) Meters used in the extraction of petroleum or gas, including Christmas tree and manifold equipment.
d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 9/6.

Not for sensors with 300 µm coating.

DN 50, DN 80, DN 100, DN 150, DN 250, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges

Flow sensor MAG 5100 W

## MAG 5100 W (7ME6520) with MAG 6000 CT (Revenue program) MI-001

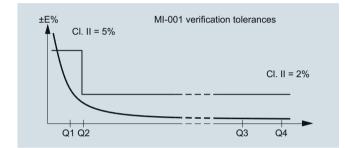
MAG 5100 W CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 5100 W MI-001 verified and labeled products are a Class II approval according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001 in the sizes from DN 50 to DN 300 (Article No. 7ME6520).

The MID certification is obtained as a modul B + D module approval according to the above mentioned directive.

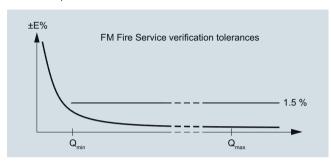
Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production



# MAG 5100 W (7ME6520) with MAG 5000/MAG 6000 or MAG 6000 CT for Fire Service applications

MAG 5100 W (7ME6520) is FM Fire Service approved for automatic fire protection systems. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250 and DN 300 (2", 3", 4", 6", 8", 10" and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



SITRANS F M

#### Flow sensor MAG 5100 W

MAG 5100 W (7ME6520) MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see table below:

Order code: P11	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	25	25	25	25	25	25	25	25	25
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630
Q2 [m <sup>3</sup> /h]	1.02	1.6	2.6	4.03	6.4	10.24	16	25.6	40.32
Q1 [m <sup>3</sup> /h]	0.64	1.00	1.60	2.52	4.0	6.4	10.0	16.0	25.2

Order code: P12	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	63	63	63	63	63	63	63	63	63
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630
Q2 [m <sup>3</sup> /h]	0.41	0.63	1.02	1.6	2.54	4.06	6.35	10.2	16.0
Q1 [m <sup>3</sup> /h]	0.25	0.40	0.63	1.00	1.59	2.54	3.97	6.35	10.0

Order code: P13	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630
Q2 [m <sup>3</sup> /h]	0.32	0.50	0.80	1.20	2.00	3.20	5.0	8.0	12.6
Q1 [m <sup>3</sup> /h]	0.20	0.31	0.50	0.75	1.25	2.00	3.13	5.0	7.90

Order code: P16	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	1600
Q2 [m <sup>3</sup> /h]	0.40	0.63	1.00	1.60	2.50	4.00	6.3	10.0	16.0
Q1 [m <sup>3</sup> /h]	0.25	0.39	0.63	1.00	1.56	2.50	3.94	6.3	10.0

Order code: P17	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	1600
Q2 [m <sup>3</sup> /h]	0.32	0.50	0.80	1.28	2.00	3.20	5.0	8.0	12.8
Q1 [m <sup>3</sup> /h]	0.20	0.32	0.50	0.80	1.25	2.00	3.15	5.0	8.0

Order code: P18	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
"R" Q3/Q1	250	250	250	250	250	250	250	250	250
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	1600
Q2 [m <sup>3</sup> /h]	0.26	0.40	0.64	1.02	1.60	2.56	4.0	6.4	10.24
Q1 [m <sup>3</sup> /h]	0.16	0.25	0.40	0.64	1.00	1.60	2.52	4.0	6.4

The Label is placed on the side of the encapsulation. An example of the product label is shown below:

OIML R 49/MI-001 approvals valid for:

- DN 50 to 300 mm (2" to 12")
- · Horizontal installation
- Compact or remote with max. 3 m cable
- Power supply 115/230 V AC

Other restrictions may apply (see certificate).

Special OIML / MI-001 settings:

- Unit: m<sup>3</sup>
- Qmax: Q3
- Digital output: Frequency

For other factory settings, see Operating Instructions.



## Flow sensor MAG 5100 W

			_			
Selection and Ordering data		Arti				
Sensor SITRANS F M MAG 5100 W Hastelloy electrodes, carbon steel flanges,		7 M				
EU water markets and low flow applications			ľ		- 2	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.						
Diameter						
DN 15 (½")		1 V				
DN 25 (1") DN 40 (1½")	•	2 D 2 R				
DN 50 (2")	•	2 Y				
DN 65 (2½")	•	3 F				
DN 80 (3")	•	3 M				
DN 100 (4")	•	3 T				
DN 125 (5") DN 150 (6")	•	4 B				
DN 200 (8")	•	4 P				
DN 250 (10")	•	4 V				
DN 300 (12") DN 350 (14")		5 D 5 K				
DN 400 (14°)		5 R				
DN 450 (18")		5 Y				
DN 500 (20")		6 F				
DN 600 (24") DN 700 (28")		6 P 6 Y				
DN 750 (30")		7 D				
DN 800 (32")		7 H				
DN 900 (36")		7 M				
DN 1000 (40")		7 R				
(42°) (44°)		7 V				
DN 1200 (48")		8 B				
Flange norm and pressure rating						
<u>to EN 1092-1</u> PN 10 (DN 200 1200/8" 48")			В			
PN 16 (DN 50 1200/2" 48")	•		С			
PN 16, non PED (DN 700 1200/28" 48")			D F			
PN 40 (DN 15 40/½" 1½") to ANSI B16.5			_			
class 150 (½" 24")	•		J			
to AWWA C-207						
Class D (28" 48")			L			
<u>to AS 4087</u> PN 16 (DN 50 1200/2" 48")			N			
Flange material and coating						
Carbon steel flanges ASTM A 105, 150 μm coating	<b>y</b>		ŀ			
Carbon steel flanges ASTM A 105, 300 μm coating	J		1	4		
<b>Liner material</b> EPDM				2		
=РЫМ NBR Hard Rubber	•			3		
Transmitter						
Sensor for remote transmitter (Order transmitter	•					Α
separately) MAG 6000 I, Aluminum, 18 90 V DC,	•					С
115 230 V AC						
MAG 6000, Polyamid, 11 30 V DC/11 24 V AC MAG 6000, Polyamid, 115 230 V AC	•					H
	-					J K
	) 🎃					N.
MAG 6000, Polyamid, 115 230 V AC MAG 5000, Polyamid, 11 30 V DC/11 24 V AC MAG 5000, Polyamid, 115 230 V AC MAG 6000 CT, Polyamid, 115 230 V AC	•					L M

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 5100 W	7ME6520-
Hastelloy electrodes, carbon steel flanges, EU water markets and low flow applications	- 2
Communication	
None	,
HART	
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	
Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I)	)
FOUNDATION Fieldbus H1 (only MAG 6000/ MAG 6000 I)	
Cable glands/terminal box	
Metric/Polyamid terminal box or 6000 I compact	
1/2" NPT/Polyamid terminal box or 6000 I compact	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### SITRANS F M

#### Flow sensor MAG 5100 W

1 1011 0011001 1111101 0100 11	
Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
FP2E marking (only France)	C17
Special calibration	
<ul> <li>5-point calibration for DN 15 DN 200<sup>1)</sup></li> <li>5-point calibration for DN 250 DN 600<sup>1)</sup></li> <li>5-point calibration for DN 700 DN 1200<sup>1)</sup></li> </ul>	D01 D02 D03
<ul> <li>10-point calibration for DN 15 DN 200<sup>2</sup>)</li> <li>10-point calibration for DN 250 DN 600<sup>2</sup>)</li> <li>10-point calibration for DN 700 DN 1200<sup>2</sup>)</li> </ul>	D06 D07 D08
<ul> <li>Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 DN 200</li> </ul>	D11
<ul> <li>Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 DN 600</li> </ul>	D12
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 DN 1200	D13
<ul> <li>5-point, matched-pair calibration for DN 15 DN 200<sup>1)</sup></li> </ul>	D15
<ul> <li>5-point, matched-pair calibration for DN 250 DN 600<sup>1)</sup></li> </ul>	D16
<ul> <li>5-point, matched-pair calibration for DN 700 DN 1200<sup>1)</sup></li> </ul>	D17
<ul> <li>10-point, matched-pair calibration for DN 15 DN 200<sup>2)</sup></li> </ul>	D18
<ul> <li>10-point, matched-pair calibration for DN 250 DN 600<sup>2)</sup></li> </ul>	D19
• 10-point, matched-pair calibration for DN 700 DN 1200 <sup>2)</sup>	D20
Approval/Verification <sup>3)</sup> (MI-001 : DN 50 300 (compact only), EN 1092-1 PN10 and PN16 flanges with MAG 6000 CT) <sup>4)</sup>	
<ul> <li>Without verification according to OIML R 49</li> </ul>	P10
• MI-001 Q3/Q1 = 25	P11
• MI-001 Q3/Q1 = 63	P12
• MI-001 Q3/Q1 = 80	P13
• MI-001 Q3/Q1 = 160	P16
• MI-001 Q3/Q1 = 200	P17
• MI-001 Q3/Q1 = 250	P18
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
• DN 50, DN 80 and DN 100 (2", 3" and 4")	P20
• DN 150 and DN 200 (6" and 8")	P21
• DN 250 and DN 300 (10" and 12")	P22
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Customer-specific converter setup	Y20
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.)	Y41
Other postproduction requirements (add desired text)	Y99

Selection and Ordering data	Order code
Additional Calibrations	
Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025:2005	On request <sup>5)</sup>
Customer-witnessed calibration Any of above calibration	On request <sup>5)</sup>

- $^{1)}$  20 %, 40 %, 60 %, 80 %, 100 % of factory  $Q_{\mbox{\scriptsize max}}$
- $^{2)}$  Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory  $Q_{\rm max}$
- 3) For more details and references of the ranges please see the tables on page 3/96.
- 4) For remote version submit Product Variation Request.
- 5) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

#### Operating instructions for SITRANS F M MAG 5100 W

Description	Article No.	
• English	A5E03063678	
<ul> <li>German</li> </ul>	A5E03376527	
<ul> <li>Spanish</li> </ul>	A5E00376529	
• French	A5E03376521	
<ul> <li>Chinese</li> </ul>	A5E03376501	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I transmitters and sensors are delivered compact mounted from factory.

Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

Flow sensor MAG 5100 W

Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 5100 W		7 M E 6 5 8 0 -
Hastelloy electrodes, carbon steel flanges, Non EU water markets		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Diameter		
DN 25 (1")	•	2 D
DN 40 (1½")	•	2 R 2 Y
DN 50 (2") DN 65 (2½")	•	3 F
DN 80 (3")	•	3 M
DN 100 (4")	•	3 T
DN 125 (5")	•	4 B
DN 150 (6") DN 200 (8")	•	4 H 4 P
DN 250 (10")	•	4 V
DN 300 (12")	•	5 D
DN 350 (14")		5 K
DN 400 (16") DN 450 (18")		5 R 5 Y
DN 500 (20")		6 F
DN 600 (24")		6 P
DN 700 (28")		6 Y 7 D
DN 750 (30") DN 800 (32")		7 H
DN 900 (36")		7 M
DN 1000 (40")		7 R
(42°) (44°)		7 U 7 V
DN 1200 (48")		8 B
DN 1400 (54") DN 1500 (60")		8 F 8 K
DN 1600 (66")		8 P
DN 1800 (72")		8 T
DN 2000 (78")		8 Y
Flange norm and pressure rating		
to EN 1092-1 PN 6 (DN 1400 2000 (54" 78")) <sup>1)</sup>		A
PN 10 (DN 200 2000 (8" 78")) <sup>1)</sup>	•	В
PN 16 (DN 65 600 (2½" 24"))	•	C
PN 16, non-PED (DN 700 2000 (28" 78")) PN 40 (DN 25 50 (1" 2"))	•	D F
to ANSI B16.5		
class 150 (1" 24")	•	J
to AWWA C-207 Class D (28" 78") <sup>1)</sup>		L L
to AS 4087 PN 16 (DN 50 1200 (2" 48"))		N
to JIS B 2220:2004 K10 (1" 24")		R
Flange material and coating		
Carbon steel flanges ASTM A 105, 150 $\mu m$ coating Carbon steel flanges ASTM A 105, 300 $\mu m$ coating		1 4
Liner material		
Ebonite Hard Rubber	•	4
Electrode material		
Hastelloy	•	2

Selection and Ordering data		Article No.	
Sensor SITRANS F M MAG 5100 W		7ME6580	-
Hastelloy electrodes, carbon steel flanges, Non EU water markets			
Transmitter with display			
Sensor for remote transmitter (Order transmitter separately)	•		A
MAG 6000, Polyamid, 11 30 V DC/11 24V AC	•		Н
MAG 6000, Polyamid, 115 230 V AC	•		J
MAG 5000, Polyamid, 11 30 V DC/11 24V AC	•		K
MAG 5000, Polyamid, 115 230 V AC	•		L
Communication		-	
No communication, add-on possible			Α
HART			В
PROFIBUS PA Profile 3 (only MAG 6000)			F
PROFIBUS DP Profile 3 (only MAG 6000)			G
Modbus RTU/RS 485 (only MAG 6000)	•		E
FOUNDATION Fieldbus H1 (only MAG 6000)			J
Cable glands/terminal box			
Metric			1
½" NPT			2
4)			

- $^{1)}\,$  DN 1400 to DN 2000 (54" to 78") do not conform to PED or CRN.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

#### SITRANS F M

#### Flow sensor MAG 5100 W

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	C12 <sup>1)</sup>
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
<ul> <li>5-point calibration for DN 15 DN 200<sup>2</sup>)</li> <li>5-point calibration for DN 250 DN 600<sup>2</sup>)</li> </ul>	D01 D02
• 5-point calibration for DN 700 DN 1200 <sup>2)</sup>	D03
• 10-point calibration for DN 15 DN 200 <sup>3)</sup>	D06
<ul> <li>10-point calibration for DN 250 DN 600<sup>3)</sup></li> <li>10-point calibration for DN 700 DN 1200<sup>3)</sup></li> </ul>	D07 D08
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 DN 200	D11
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 DN 600	D12
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 DN 1200	D13
• 5-point, matched-pair calibration for DN 15 DN 200 <sup>2)</sup>	D15
• 5-point, matched-pair calibration for DN 250 DN 600 <sup>2</sup>	D16
5-point, matched-pair calibration for DN 700 DN 1200 <sup>2)</sup>	D17
10-point, matched-pair calibration for DN 15 DN 200 <sup>3)</sup>	D18
10-point, matched-pair calibration for DN 250 DN 600 <sup>3</sup>	D19
10-point, matched-pair calibration for DN 700 DN 1200 <sup>3)</sup>	D20
Tag name plate, stainless steel fixed with SS wire	Y17
Tag name plate, plastic (self-adhesive)	Y18
Customer-specific converter setup	Y20
Sensor cables wired (specify cable Article No.)	Y40
Sensor for remote transmitter's junction box potted to	Y41
IP68 with wired cable (specify cable Article No.)	
Other postproduction requirements (add desired text)	Y99

#### 1) Under preparation

#### Operating instructions for SITRANS F M MAG 5100 W

Description	Article No.	
German	A5E03376527	
<ul> <li>English</li> </ul>	A5E03063678	
<ul> <li>French</li> </ul>	A5E03376521	
<ul> <li>Spanish</li> </ul>	A5E03376529	
• Chinese	A5E03376501	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description		Article No.		
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	•	FDK:085U0220	The second secon	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place.

Communication module will be pre-mounted in the transmitter. Please use online Product selector to get latest updates.

Product selector link: www.pia-portal.automation.siemens.com

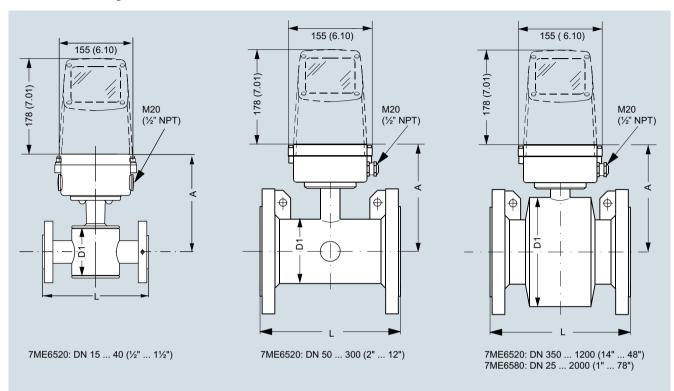
 $<sup>^{2)}</sup>$  20 %, 40 %, 60 %, 80 %, 100 % of factory  $Q_{\mbox{\scriptsize max}}$ 

 $<sup>^{3)}</sup>$  Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory  $\rm Q_{max}$ 

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Flow sensor MAG 5100 W

## Dimensional drawings



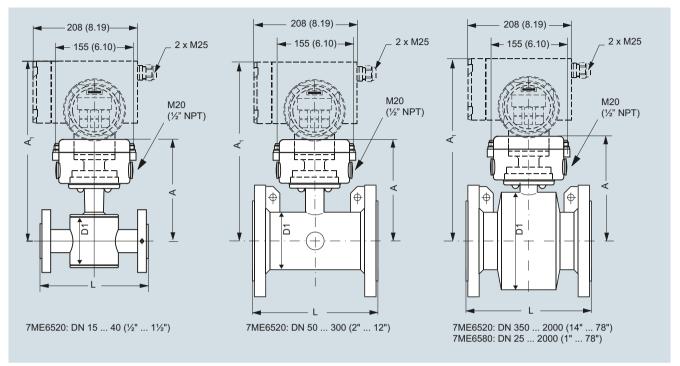
		7ME6520	NBR or EPD	M liner		7ME6580	Ebonite line	r			
Nomir	nal size	Α		D1		Α		D1		L	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	1/2	177	7.0	77	3.0	-	-	-	-	200	7.9
25	1	187	7.4	96	3.8	187	7.4	104	4.09	200	7.9
40	11/2	202	8.0	127	5.0	197	7.8	124	4.88	200	7.9
50	2	188	7.4	76	3.0	205	8.1	139	5.47	200	7.9
65	21/2	194	7.6	89	3.5	212	8.3	154	6.06	200	7.9
80	3	200	7.9	102	4.0	222	8.7	174	6.85	200	7.9
100	4	207	8.1	114	4.5	242	9.5	214	8.43	250	9.8
125	5	217	8.5	140	5.5	255	10.0	239	9.41	250	9.8
150	6	232	9.1	168	6.6	276	10.9	282	11.1	300	11.8
200	8	257	10.1	219	8.6	304	12.0	338	13.31	350	13.8
250	10	284	11.2	273	10.8	332	13.1	393	15.47	450	17.7
300	12	310	12.2	324	12.8	357	14.1	444	17.48	500	19.7
350	14	382	15.0	451	17.8	362	14.3	451	17.76	550	21.7
400	16	407	16.0	502	19.8	387	15.2	502	19.76	600	23.6
450	18	438	17.2	563	22.2	418	16.5	563	22.16	600	23.6
500	20	463	18.2	614	24.2	443	17.4	614	24.17	600	23.6
600	24	514	20.2	715	28.2	494	19.4	715	28.15	600	23.6
700	28	564	22.2	816	32.1	544	21.4	816	32.13	700	27.6
750	30	591	23.3	869	34.2	571	22.5	869	34.21	750	29.5
800	32	616	24.3	927	36.5	606	23.9	927	36.5	800	31.5
900	36	663	26.1	1032	40.6	653	25.7	1032	40.63	900	35.4
1000	40	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	42	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	44	765	30.1	1238	48.7	755	29.7	1238	48.74	1100	43.3
1200	48	820	32.3	1348	53.1	810	31.9	1348	53.07	1200	47.2
1400	54	-	-	-	-	925	36.4	1574	65.94	1400	55.1
1500	60	-	-	-	-	972	38.2	1672	65.83	1500	59.1
1600	66	-	-	-	-	1025	40.4	1774	75.39	1600	63
1800	72	-	-	-	-	1123	44.2	1974	77.72	1800	70.9
2000	78	-	-	-	-	1223	48.1	2174	85.59	2000	78.7

- not available

SITRANS F M

#### Flow sensor MAG 5100 W

#### MAG 5100 W/6000 I Compact



		7ME652	20 NBR o	r EPDM li	ner			7ME65	80 Ebonii	te liner					
Nomir	nal size	Α		A1		D1		A		A1		D1		L	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	1/2	177	7.0	331	13.0	77	3.0	187	7.4	-	-	-	-	200	7.9
25	1	187	7.4	341	13.4	96	3.8	187	7.4	341	13.4	104	4.09	200	7.9
40	11/2	202	8.0	356	14.0	127	5.0	197	7.8	351	13.8	124	4.88	200	7.9
50	2	188	7.4	342	13.5	76	3.0	205	8.1	359	14.1	139	5.47	200	7.9
65	21/2	194	7.6	348	13.7	89	3.5	212	8.3	366	14.4	154	6.06	200	7.9
80	3	200	7.9	354	14.0	102	4.0	222	8.7	376	14.8	174	6.85	200	7.9
100	4	207	8.1	361	14.2	114	4.5	242	9.5	396	15.6	214	8.43	250	9.8
125	5	217	8.5	371	14.6	140	5.5	255	10.0	409	16.1	239	9.41	250	9.8
150	6	232	9.1	386	15.2	168	6.6	276	10.9	430	16.9	282	11.1	300	11.8
200	8	257	10.1	411	16.2	219	8.6	304	12.0	458	18.0	338	13.31	350	13.8
250	10	284	11.2	438	17.2	273	10.8	332	13.1	486	19.1	393	15.47	450	17.7
300	12	310	12.2	464	18.3	324	12.8	357	14.1	511	20.1	444	17.48	500	19.7
350	14	382	15.0	536	21.1	451	17.8	362	14.3	516	20.3	451	17.76	550	21.7
400	16	407	16.0	561	22.1	502	19.8	387	15.2	541	21.3	502	19.76	600	23.6
450	18	438	17.2	592	23.3	563	22.2	418	16.5	572	22.5	563	22.16	600	23.6
500	20	463	18.2	617	24.3	614	24.2	443	17.4	597	23.5	614	24.17	600	23.6
600	24	514	20.2	668	26.3	715	28.2	494	19.4	648	25.5	715	28.15	600	23.6
700	28	564	22.2	718	28.3	816	32.1	544	21.4	698	27.5	816	32.13	700	27.6
750	30	591	23.3	745	29.3	869	34.2	571	22.5	725	28.5	869	34.21	750	29.5
800	32	616	24.3	770	30.3	927	36.5	606	23.9	760	29.9	927	36.5	800	31.5
900	36	663	26.1	817	32.2	1032	40.6	653	25.7	807	31.8	1032	40.63	900	35.4
1000	40	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4
	42	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4
	44	765	30.1	919	36.2	1238	48.7	755	29.7	904	35.6	1238	48.74	1100	43.3
1200	48	820	32.3	974	38.3	1348	53.1	810	31.9	964	38.0	1348	53.07	1200	47.2
1400	54	-	-	-	-	-	-	925	36.4	1079	42.5	1574	61.97	1400	55.1
1500	60	-	-	-	-	-	-	972	38.2	1126	44.3	1672	65.83	1500	59.1
1600	66	-	-	-	-	-	-	1025	40.4	1179	46.4	1774	69.84	1600	63.0
1800	72	-	-	-	-	-	-	1123	44.2	1277	50.3	1974	77.72	1800	70.9
2000	78	-	-	-	-	-	-	1223	48.1	1377	54.2	2174	85.59	2000	78.7

<sup>-</sup> not available

Flow sensor MAG 5100 W

#### Weight

		7ME652 NBR or	20 · EPDM lin	er								7ME658 Ebonite	
Nominal size		PN 10		PN 16		PN 40		Class 1	Class 150/AWWA			PN 16	
[mm]	[inch]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]
15	1/2	-	-	-	-	4	9	4	9	4	9	5	11
25	1	-	-	-	-	6	12	5	11	4	9	5	11
40	11/2	-	-	-	-	8	18	7	15	7	15	8	17
50	2	-	-	9	20	-	-	8	20	9	20	9	20
65	21/2	-	-	10.7	24	-	-	11	24	10.7	24	11	24
80	3	-	-	11.6	26	-	-	13	28	11.6	26	12	26
100	4	-	-	15.2	33	-	-	19	41	15.2	33	16	35
125	5	-	-	20.4	45	-	-	24	52	-	-	19	42
150	6	-	-	26	57	-	-	29	64	26	57	27	60
200	8	48	106	48	106	-	-	56	124	48	106	40	88
250	10	64	141	69	152	-	-	79	174	69	152	60	132
300	12	76	167	86	189	-	-	110	243	86	189	80	176
350	14	104	229	125	274	-	-	139	307	115	254	110	242
400	16	119	263	143	314	-	-	159	351	125	277	125	275
450	18	136	299	173	381	-	-	182	400	141	311	175	385
500	20	163	359	223	491	-	-	225	495	189	418	200	440
600	24	236	519	338	744	-	-	320	704	301	664	287	633
700	28	270	595	314	692	-	-	273	602	320	704	330	728
750	30	-	-	-	-	-	-	329	725	-	-	360	794
800	32	346	763	396	873	-	-	365	804	428	944	450	992
900	36	432	951	474	1043	-	-	495	1089	619	1362	530	1168
1000	40	513	1130	600	1321	-	-	583	1282	636	1399	660	1455
	42	-	-	-	-	-	-	687	1512	-	-	-	-
	44	-	-	-	-	-	-	763	1680	-	-	1140	2513
1200	48	643	1415	885	1948	-	-	861	1896	813	1789	1180	260
1400	54	1592	3510	-	-	-	-	-	-	-	-	1600	3528
1500	60	-	-	-	-	-	-	-	-	-	-	2460	5423
1600	66	2110	4652	-	-	-	-	-	-	-	-	2525	5566
1800	72	2560	5644	-	-	-	-	-	-	-	-	2930	6460
2000	78	3640	8025	-	-	-	-	-	-	-	-	3665	8080

<sup>-</sup> not available

With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).

SITRANS F M

#### Transmitter TRANSMAG 2 with sensor 911/E

#### Overview



SITRANS F M TRANSMAG 2 with the SITRANS F M 911/E sensor is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

#### Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- · Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensiv self-diagnostic with selfmonitoring and internal simulation

#### Application

The main applications of the SITRANS F M transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
- · Mining industry

The pulse alternating field technology is ideal for difficult applications like:

- High concentrated paper stock > 3 %
- · Heavy mining slurries
- · Mining slurries with magnetic particles.
- Low conductive medias ≥1 µS/cm (0.1 µS/cm depending on medium)

#### Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

#### Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

#### Function

The TRANSMAG 2 is a microprocessor-based transmitter with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

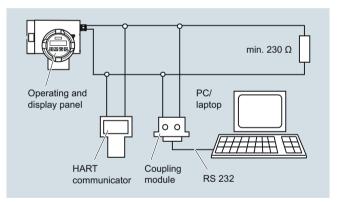
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

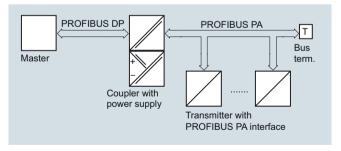
#### Displays and keypad

Operation of the transmitter can be carried out using:

- · Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



HART communication



PROFIBUS PA communication

## Transmitter TRANSMAG 2 with sensor 911/E

Technical specifications			
Transmitter TRANSMAG 2		Output configuration	
Mode of operation and design		• Pulse	
Measuring principle	Electromagnetic with pulsed	- Pulse significance	≤ 5000 pulses/s
	alternating field (PAC)	- Pulse width	≥ 0.1 ms
Magnetic field excitation	Automatic power supply syn- chronization	• Limit frequency	≤ 10000 Hz
- 50 Hz AC power supply	Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.33 Hz)	<ul><li>Limits</li><li>Digital output 2 (relay)</li></ul>	Limits for flow and quantity, flow direction, alarm
- 60 Hz AC power supply	Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)	(only 7ME5034-0) Relay	NC or NO function
Accuracy under reference conditions		Rating	Max. 5 W, max. 50 V AC/DC, max. 200 mA
Measuring tolerance of pulse output		<ul> <li>Output configuration</li> </ul>	Limits for flow and quantity, flow direction, alarm
• With v > 0.25 m/s (0.82 ft/s)	$\leq$ ± 0.5 % of measured value ± 1.2 mm/s (0.05 inch/s)	Digital input (optional to digital output 2)	anconon, alam
• With v < 0.25 m/s (0.82 ft/s)	± 2.5 mm/s (0.1 inch/s)	(only 7ME5034-2)	
Measuring tolerance of analog output	As pulse output plus $\pm$ 0.1 % conversion error $\pm$ 20 $\mu$ A	<ul> <li>Input function configurable as high-active or low-active</li> </ul>	Set measured value or counter to zero
Repeatability	0.2 % of measured value	• Signal voltage	Max. 30 V DC, $R_i = 3 kΩ$ :
Reference conditions			High level: +11 +30 V DC Low level: -30 +5 V DC
<ul> <li>Process temperature</li> </ul>	25 °C ± 5 °C (77 °F ± 9 °F)	For PROFIBUS devices	20 W 16 V 21 10 V 20
Ambient temperature	25 °C ± 5 °C (77 °F ± 9 °F)	PROFIBUS PA (for	
Warm-up time	Min. 30 min	PROFIBUS-devices 7ME5034-1)	
Installation conditions	Inlet pipe section $\geq 10 \times DN$ Outlet pipe section $\geq 5 \times DN$	Communication	Layer 1 and 2 according to PROFIBUS PA
	Installed centered in pipe		Transmission according to
• Medium	Water without gaseous or solid components		IEC 1158-2  Layer 7 (protocol layer) according to PROFIBUS PA and DP V1
Calibration			(EN 50170)
Standard production calibration, calibration report shipped with sensor	Zero-point, 2 x 25 % and 2 x 90 %		Device class B, device profile 2.0 Max. 4 simultaneous C2 connections
Output		Bus voltage	9 32 V DC permissible
Electrical isolation	Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding	Current consumption from bus	10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation
Current output	0/4 20 mA	Rated operating conditions	
<u></u>	(7ME5034-0 or 7ME5034-2)	Installation conditions	See also sensor
• Signal		Ambient temperature	
- Upper limit	0/4 20 mA, selectable	<ul> <li>Operation</li> </ul>	-20 +60 °C (-4 +140 °F)
- Failure	20 22.5 mA, optional 3.6; 20 or 24 mA	<ul> <li>Display module</li> <li>Storage</li> </ul>	0 50 °C (32 122 °F) -25 +80 °C (-13 +176 °F)
• Load		Degree of protection	IP67/NEMA 4X
- Output	max. 600 $\Omega$ , max. load voltage 15 V DC	Electromagnetic compatibility (EMC)	67,712
- For HART communication	≥ 250 Ω	Emitted interference	To IEC/EN 61326 for use in
Communication	Via analog output with PC cou- pling module or HART communi- cator	Noise immunity	industrial areas To IEC/EN 61326 for use in
Protocol	HART, version 5.1	-	industrial areas
Digital output	1 1/ 11 11, VOI 31 UT 3. T		
Signal			
• Output	Configurable as active or passive signals		

24 V DC,  $\leq$  24 mA,  $R_{i}$  = 170  $\Omega$ 

Open collector, max. 30 V DC, 200 mA

- Active signal

- Passive signal

#### SITRANS F M

#### Transmitter TRANSMAG 2 with sensor 911/E

Medium conditions	
Process temperature	-20 +150 °C (-4 302 °F) depending on the liner
Minimum conductivity of medium	
With SITRANS F M 911/E sensors	$\geq$ 1 $\mu S/cm$ (0.1 $\mu S/cm$ depending on medium)
Design	
Weight of transmitter	4.4 kg (9.7 lb)
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminum, painted
Displays and keypad	
General display	LCD, backlid, two lines with 16 characters each
Multi-display for	Flow, totalizer, flow velocity
Keypad	4 keys for entering parameters
Power supply	
corresponding to rating plate	
AC supply	100 250 V AC ± 15 %, 47 63 Hz
Power consumption	Approx. 120 630 VA, depending on sensor
Line fuse	100 230 V AC: T1.6A
Magnet current fuse	F5A/250 V

#### Sensor cables between sensor and transmitter

The signal voltage proportional to the flow and present at the electrodes of the EMF is only a few  $\mu V$  to mV. Superimposed on this are electrochemical interferences resulting from the contact between the electrodes and liquid, and which can be up to several Volt. Also frequently superimposed are line frequency interferences, interferences resulting from vibrations on the pipelines or signal cables, as well as strong magnetic fields in the vicinity. Sufficient shielding must therefore be provided, as well as fixed routing of the signal cables (electrode and magnet current cable) in the case of remote versions. This also applies to devices with integral preamplifier (smartPLUG). The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

Attention must also be paid to the cable routing. Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in earthed steel conduit.

Selection and Ordering data	Article No.
SITRANS F M electromagnetic transmitter TRANSMAG 2 for alternating field, remote version, 110 230 V AC	7 M E 5 0 3 4 - AA 1 - AA 0
Output/communication 4 20 mA with HART protocol PROFIBUS PA connection 4 20 mA with HART protocol, digital input	0 1 2
Operator display and keypad Without With	0
Cable glands M20/M16 x 1.5 ½" NPT	1 2

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Strengthened mounting bracket for wall and pipeline installation	A02
Measuring range, specify in plain text: $Y01: 0 \text{ to } \text{ m}^3/h$	Y01
Pulse significance, specify in plain text: Y02: 0 to pulses/l	Y02
Setting of digital outputs, specify in plain text: Y03: Setting of digital outputs:	Y03
Measuring-point number (max. 8 characters), specify in plain text: Y15:	Y15
Measuring-point description (max. 16 characters), specify in plain text: Y16:	Y16
Stainless steel tag plate	Y17
Other post-production requirements (add plain text)	Y99

#### Operating instructions for SITRANS F M TRANSMAG 2

Description	Article No.	
• English	A5E00102775	
German	A5E00192774	
<ul> <li>Spanish</li> </ul>	A5E00135276	
• French	A5E00135275	

This device is shipped with a Quick Start guide and a CD containing further SITRANS  ${\sf F}$  literature.

#### All literature is also available for free at:

http://www.siemens.com/flowdocumentation

## Transmitter TRANSMAG 2 with sensor 911/E

Accessories		
Description	Article No.	
Standard wall mounting bracket. Steel AISI 316L/ EN10088-2-1.4404	7ME5933-0AC04	
Special wall-/pipe mount- ing bracket kit. BI 2.5 DIN 59382 X6Cr17	7ME5933-0AC05	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	

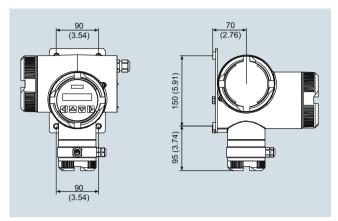
 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Spare parts		
Description	Article No.	
Operating/Display module	7ME5933-0AC00	STRANG F
Electronics cover with glass plate (non Ex). Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC01	
Cover for sensor cable and gasket. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC02	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC03	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	9
M20 cable gland set for power and output connection, gray PA plastic, 2 pcs.  • cables Ø 6 12 mm (0.24" 0.47")  • -40 +100 °C (-40 +212 °F)	A5E02246350	
1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 12 mm (0.24" 0.47") • -40 +100 °C (-40 +212 °F)	A5E02246396	
M16 x 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 9 mm (0.20" 0.35") • -20 +105°C (-4 +221°F)	A5E02246369	

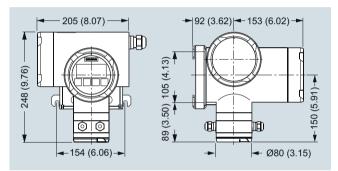
SITRANS F M

#### Transmitter TRANSMAG 2 with sensor 911/E

#### Dimensional drawings

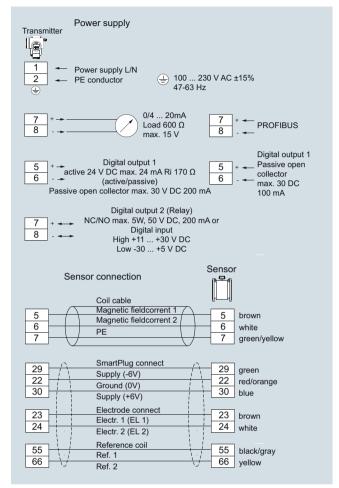


SITRANS F M transmitter TRANSMAG 2 with wall mounting bracket, dimensions in mm (inch)



SITRANS F M transmitter TRANSMAG 2 with wall and pipeline mounting bracket, dimensions in mm (inch)

## Schematics

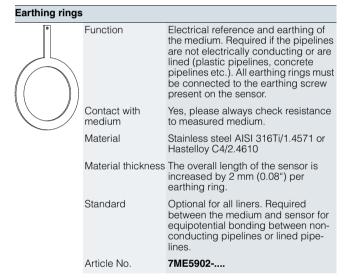


SITRANS F M transmitter TRANSMAG 2, connection diagram

#### Transmitter TRANSMAG 2 with sensor 911/E

911/E sensor	
Process connection	
Nominal diameters	DN 15 1000 (½" 40")
Metering tube connections	EN 1092-1, ANSI B16.5, AWWA C-207 and JIS 10 K
Rated operating conditions	
Installation conditions	See system information
Soft rubber liner	0 70 °C (32 158 °F)
Hard rubber liner	0 90 °C (32 194 °F) Option: 100 °C (212 °F)
PTFE liner	<ul> <li>-20 +150 °C (-4 +302 °F) at 25 bar (363 psi)</li> <li>-20 +100 °C (-4 +212 °F) at 40 bar (580 psi)</li> </ul>
• Linatex (rubber) liner	-40 +70 °C (-40 +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used)
Novolak liner	130 °C (266 °F) at 40 bar (580 psi)
Degree of protection	IP67/NEMA 4X
	Optional IP68/NEMA 6
Medium conditions	
Maximum flow velocity	12 m/s (39.4 ft/s)
Full scale value of flow velocity	0.15 12 m/s (0.49 39.4 ft/s)
Design	
Weight	See dimensional drawings
Flange and housing material	Mild steel (1.0460/1.0570, with corrosion resistant two component epoxy coating (min. 150 $\mu$ m)
	or AISI 316L/1.4404 flanges and carbon steel housing, with corrosion-resistant two-component epoxy coating (min. 150 μm)
Measuring pipe material	Stainless steel AISI 304 or higher
Electrode material	• AISI 316Ti/1.4571
	<ul><li>PTFE: Hastelloy C276/2.4819</li><li>Platinum</li><li>Titanium</li><li>Tantalum</li></ul>
Grounding electrode material	Defined via the Order code

Protection rings for liners				
	Function	To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F).		
	Contact with medium	Yes, please always check resistance to measured medium.		
	Material	Stainless steel AISI 316Ti/1.4571, optionally Hastelloy C276/2.4819		
	Material thickness	The overall length of the sensor is increased by •6 mm for DN 15 to DN 150 (0.24" for ½" to 6") or •10 mm for DN 200 to DN 600 (0.4" for 8" to 24")		
	Standard	Optional for all liners. Must be ordered separately.		
	Article No.	7ME5912		



#### Important:

The rings must be ordered together with the sensor. In case of replacement please include the sensor MLFB code on the order.

SITRANS F M

125 ... 600

#### Transmitter TRANSMAG 2 with sensor 911/E

#### Notes on pressure equipment directive

(5" ... 24")

The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.

The minimum temperature is defined at -10 °C (14 °F) for the flange materials C22.8 (1.0460). The minimum temperature is defined at -20 °C (-4 °F) for the

flange material 1.4404/316L. For further information on the PED standard and requirements, see page 9/6.

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(580)

Classification according to pressure equipment directive (PED 97/23/EC)					
Nominal diameter Nominal pressure		Permissible media	Category		
DN	(inch)	PN	(MWP psi)		
15 25	(½" 1")	40	(580)	Gases fluid group 1 and liquids fluid group 1	Article 3.3
200 300	(8" 12")	10	(145)	Gases fluid group 1 and liquids fluid group 1	II
65 250	(2½" 10")	16	(232)	Gases fluid group 1 and liquids fluid group 1	II
40 100	(1½" 4")	40	(580)	Gases fluid group 1 and liquids fluid group 1	II
350 1000	(14" 40")	10	(145)	Gases fluid group 1 and liquids fluid group 1	III
300 1000	(12" 40")	16	(232)	Gases fluid group 1 and liquids fluid group 1	III
200 600	(8" 24")	25	(363)	Gases fluid group 1 and liquids fluid group 1	III

Gases fluid group 1 and liquids fluid group 1

Ш

3/110

## Transmitter TRANSMAG 2 with sensor 911/E

Selection and Ordering data	Article No.
Flowsensor SITRANS F M 911/E	7ME5610-
	- AA
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal diameter	
DN 15 (½") DN 25 (1")	1 V 2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½") DN 80 (3")	3 F 3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8") DN 250 (10")	4 P 4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16") DN 450 (18")	5 R 5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 750 (30") DN 800 (32")	7 D 7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
Flange norm and pressure rating EN 1092-1, PN 10 (DN 200 1000 (8" 40"))	В
EN 1092-1, PN 16 (DN 200 1000 (8 40 )) EN 1092-1, PN 16 (DN 65 1000 (2½" 40"))	C
EN 1092-1, PN 25 (DN 200 1000 (8" 40"))	E III
EN 1092-1, PN 40 (DN 15 1000 (½" 40")) ANSI B16.5, Class 150 (½" 24") <sup>1)</sup>	- <u> </u>
ANSI B16.5, Class 150 (½ 24 ) <sup>17</sup> ANSI B16.5, Class 300 (½" 24") <sup>2)</sup>	J K
AWWA C-207 Class D (28" 40")	L
JIS 10 K (½" 24")	R
Flange material Mid steel flanges 1.0460/1.0570	1
Stainless steel flanges, AISI 316L/1.4404	3
Liner material	
Soft rubber (DN 25 to DN 1000) PTFE (DN 15 to DN 600)	1 3
Hardrubber (DN 15 to DN 1000)	4
Linatex (DN 40 to DN 1000)	5 6
Novolak (sealing material FFKM) (from DN 50 to DN 1000)	
Electrode material	
AISI 316Ti/1.4571 Hastelloy C276/2.4819	1 2
Platinum	3
Titanium Tantalum	4 5
Cable glands/terminal box	3
Metric: Polyamide terminal box	1
½" NPT: Polyamide terminal box	2

Selection and Ordering data	Order Code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Two earthing (grounding) electrodes made of stainless steel AISI 316Ti/1.4571	A02
Two earthing (grounding) electrodes made of Hastelloy C276/2.4819	A04
Two earthing (grounding) electrodes made of Platinum	A05
Two earthing (grounding) electrodes made of Titanum	A06
Two earthing (grounding) electrodes made of Tantalum	A07
Factory certificate to EN 10204-2.2	C14
Acceptance test B to DIN 50049, section 3.1 and EN 10204	C16
Tag name plate, stainless steel, add plain text	Y17
Other postproduction requirements, add plain text	Y99
4)	

 $<sup>^{1)}</sup>$  20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless seel flanges

<sup>2) 20 °</sup>C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless seel flanges

Selection and Ordering data	Article No. Order code
SITRANS F M TRANSMAG 2 and sensor 911/E	7 M E 5 9 3 0 -
Cable	5 A 0 0 - 0 A A 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Cable kit for sensor 911/E with alternating field, Magnet current cable 3 x 1.0 mm² (3 x 0.0016 inch²), electrode/reference cable 7 x 0.5 mm² (7 x 0.0008 inch²) with shield PVC  • Length: 5 m (16.4 ft)  • Length: 10 m (32.8 ft)  • Length: 20 m (65.6 ft)  • Length: 30 m (98.4 ft)  • Other length (specify in plain text): max. 100 m (328 ft)	B C D E Z J1Y

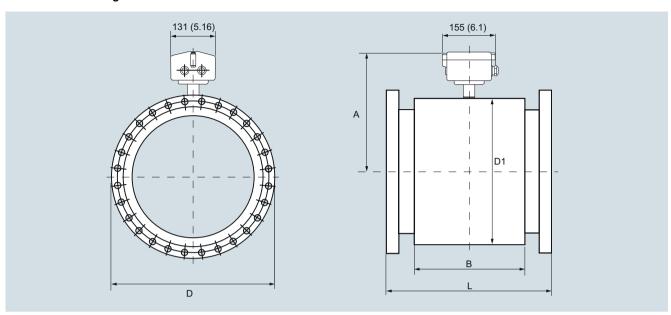
SITRANS F M

## Transmitter TRANSMAG 2 with sensor 911/E

Selection and Ordering data	Article No.	Orde	r co	de	Selection and Ordering data	Article No.	Orde	er code
SITRANS F M electromagnetic flowmeter					SITRANS F M electromagnetic flowmeter			
Protection rings for flow sensor 911E (per pair)	7 M E 5 9 1 2 -			Earthing rings for flow sensor 911E (per unit)	7 M E 5 9 0 2 -		Ш	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Liner					Liner			
Hard rubber/soft rubber/Linatex Novolak	1 7				Hard rubber/soft rubber Novolak		7	
PTFE	0				PTFE		0	
Nominal diameter					Nominal diameter			
for PTFE, mat. no. 1.4571/316 Ti DN 15 (½") DN 25 (1")		A A C A			<u>Mat. no. 1.4571/316 Ti</u> DN 15 (½") DN 25 (1")		A A C A	Ш
DN 40 (1½")		EA			DN 40 (1½")		EA	
DN 50 (2")		FA			DN 50 (2")		FA	
DN 65 (2½") DN 80 (3")		G A			DN 65 (2½")		GA	
DN 80 (3 ) DN 100 (4")		H A J A			DN 80 (3") DN 100 (4")		H A J A	
DN 125 (5")		KA			DN 125 (5")		KA	
DN 150 (6") DN 200 (8")		L A M A			DN 150 (6") DN 200 (8")		L A M A	
DN 250 (10")		N A			DN 250 (8 ) DN 250 (10")		N A	
DN 300 (12")		PA			DN 300 (12")		PA	
Other nominal diameters: specify in plain text		ΖA	J 1	Y	DN 350 (14") DN 400 (16")		Q A R A	Ш
for Hard/Soft rubber, Novolak, mat. no. 1.471/316 Ti					DN 500 (20")		SA	
DN 15 (½")		ΑВ			DN 600 (24") DN 700 (28")		UA	
DN 25 (1")		СВ			DN 800 (32")		VA	
DN 40 (1½") DN 50 (2")		EB FB			DN 900 (36") DN 1000 (40")		WA XA	
DN 65 (2½")		GB			Other nominal diam.: specify in plain text		ZA	J 1 Y
DN 80 (3")		нв			Material Hastellov C4/2.4610			• • •
DN 100 (4")		JB			DN 15 (½")		АВ	
DN 125 (5") DN 150 (6")		KB LB			DN 25 (1")		СВ	
DN 200 (8")		МВ			DN 40 (1½") DN 50 (2")		E B F B	
DN 250 (10")		NB			DN 65 (2½")		GВ	
DN 300 (12") Other nominal diameters:		PB ZB	J 1	v	DN 80 (3") DN 100 (4")		HB JB	
specify in plain text		20	٠,	ľ	DN 125 (5")		KB	
Flange design	_				DN 150 (6")		L B	
Flange to DIN Flange to ANSI		1 2			DN 200 (8")		MB	
Flange to JIS		3			DN 250 (10") DN 300 (12")		N B P B	
					DN 350 (14")		QB	
					DN 400 (16") DN 500 (20") DN 600 (24")		RB SB TB	
					Other nominal diam.: specify in plain text		ZB	J 1 Y
					Flange design			0 1 1
					Flange to DIN		1	
					Flange to ANSI Flange to JIS		2	

#### Transmitter TRANSMAG 2 with sensor 911/E

## Dimensional drawings



SITRANS F M flow sensor 911/E, remote version, dimensions in mm (inch)

#### Build-in length 911/E [in mm and inch]

Nominal diameter	DN 15 ½"	DN 25 1"	DN 40 1 ½"	DN 50 2"	DN 65 2 ½"	DN 80 3"	DN 100 4"	DN 125 5"	DN 150 6"	DN 200 8"	DN 250 10"
					Bu	ild-in leng	th L <sup>1)</sup>				
Hard rubber version Linatex/soft rubber version		270 0.63)		280 1.02)	330 (12.99)		340 3.39)		370 4.57)	410 (16.14)	470 (18.50)
PTFE-liner without protection rings		270 0.63)		280 1.02)	330 (12.99)		340 3.39)	370 (14.57)		410 (16.14)	470 (18.50)
Novolak-version		-		275 0.83)	325 (12.79)	335 (13.19)	333 (13.11)		862 4.25)	401 (15.79)	460 (18.11)
			4		Dimensio	ns of sen	sor housi	ng			
Housing width B					170 (6.69	9)				240	(9.45)
Height A	206	(8.11)	222 (8.74)	229 (9.02)		262 0.32)	274 (10.79)	286 (11.26)	299 (11.78)	334 (13.15)	358 (14.10)
Housing diameter D <sub>1</sub>		135 5.35)	167 (6.58)	182 (7.17)	_	247 0.73)	272 (10.71)	296 (11.65)	322 (12.68)	392 (15.43)	440 (17.32)
Weight of PN16 version in kg (MWP 232 psi version in lb) approx.	8.0 (17.64)	8.5 (18.74)	11.5 (25.35)	25.0 (55.12)	26 (57.32)	27 (59.53)	28 (61.73)	34 (74.95)	38 (83.78)	68 (149.9)	81 (178.6)
Nominal diameter	DN 300 12"	DN 350 14"	DN 400 16"	DN 450 18"	DN 500 20"	DN 600 24"	DN 700 28"	DN 750 30"	DN 800 32"	DN 900 36"	DN 1000 40"
					Bu	ild-in leng	th L <sup>1)</sup>				
Hard rubber version Linatex/soft rubber version	500 (19.68)	550 (21.65)	600 (23.62)	650 (25.59)	650 (25.59)	780 (30.71)		910 5.83)	1040 (40.95)	1170 (46.06)	1300 (51.18)
PTFE-liner without protection rings	500 (19.68)	550 (21.65)	600 (23.62)	660 (25.98)	650 (25.59)	780 (30.71)			-		
Novolak-version	489 (19.25)	538 (21.18)	592 (23.31)	638 (25.12)	638 (25.12)	772 (30.39)		903 5.55)	1033 (40.63)	1163 (45.79)	1293 (50.91)
					Dimensio	ns of sen	sor housi	ng			
Housing width B	240 (9.45)	225 (8.86)	250 (9.84)	270 (10.63)	300 (11.81)	360 (14.17)		420 6.54)	500 (19.69)	560 (22.05)	620 (24.41)
Height A	383 (15.08)	375 (14.76)	400 (15.75)	433 (17.05)	453 (17.84)	505 (19.88)	558 (21.97)	590 (23.23)	608 (23.94)	658 (25.91)	713 (28.07)
Housing diameter D <sub>1</sub>	490 (19.29)	474 (18.66)	524 (20.63)	591 (23.26)	629 (24.76)	734 (28.90)	839 (33.03)	904 (35.59)	939 (36.97)	1039 (40.91)	1150 (45.28)
Weight of PN10 Version in kg (MWP 145 psi version in lb) approx.	95 (209.4)	118 (260.2)	161 (354.9)	185 (407.9)	233 (513.7)	401 (884.1)	420 (925.9)	450 (992.1)	500 (1102.3)	560 (1234.6)	620 (1366.9)

 $<sup>^{1)}</sup>$  Tolerance for build-in lenght: L + 0.0/-4.0 mm (+0.00/-0.157 inch) With protection rings for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1" + 0.236 inch, > 8" + 0.394 inch)

SITRANS F M

## Battery-operated water meter MAG 8000

#### Overview



MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

#### Benefits

#### Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply internal or external battery pack or mains power supply with battery back-up possibilities
- Superior measurement
- Down to 0.2 % maximum uncertainty
- OIML R 49 type approval
- PTB K7.2
- FM Fire Service Approval
- Bi-directional measurement

#### Long lasting performance/Low cost of Ownership

- Verification according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001
- No moving parts means less wear and tear
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

#### Intelligent information, easy to access

- Advanced information on site
- Data logger
- · Advanced statistics and diagnostics
- Add-on communication modules

#### Application

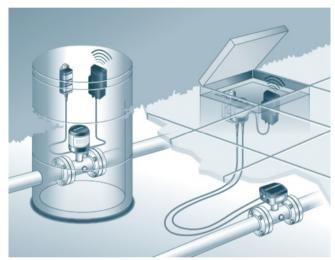
The following MAG 8000 versions are available as stand-alone water meters:

- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering
- MAG 8000 (7ME6880) for irrigation

#### Design

MAG 8000 is designed to minimize power consumption. The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares





Modbus/Encoder module

#### Battery-operated water meter MAG 8000



GSM/GPRS communication module



PC-IrDA connection

#### MAG 8000 GSM/GPRS Wireless Communication Module

The MAG 8000 GSM/GPRS wireless communication module provides the latest mobile technology using a Quad Band (850/900/1800/1900 MHz) module.

The GSM/GPRS module logs data from the MAG 8000 memory and from the two analog inputs (one 4 to 20 mA not powered by the module and one 5 V ratiometric powered by the module) and storage in the internal memory and later transmit it into a system or PC via email or SMS.

An additional synchronization function secures the initial collection time of the data independent of the sample rate used (minimum collection time: 1 per minute).

The package of information retrieved via the csv file includes:

- Time stamp
- Flow rate
- Tot 1
- Tot 2
- Tot 3
- Analog 1 (mA)
- Analog 2 (V)
- · Battery lifetime
- Alarm list (as decimal format)

The GPRS technology makes it possible to send a higher amount of data via email. The data is secured using a POP 3 server configuration avoiding encryptions that require additional software. The configuration of the module is performed via SMS commands that allow you to define the users, email accounts, transmission settings, collection, etc.

The GSM/GPRS module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher.

The battery lifetime will depend on signal strength and especially on the number of transmissions. Therefore we recommend an optimal setting of transmission once a day (see page 3/119). The module also includes the same power management algorithm that secures a very good calculation of the remaining battery lifetime.

The OPC server specifically designed for the MAG 8000 GSM/GPRS module is offered free of charge. With this value-added package, the opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered.

SITRANS F M

## Battery-operated water meter MAG 8000

#### Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostics ensure optimum meter performance and information to optimize water supply and billing.



MAG 8000 can be ordered as a Basic or an Advanced version.

Features / Version	MAG 8000 Basic/ MAG 8000 Irrigation	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected) <sup>1)</sup>	1/15, 1/30 or 1/60 Hz	from 6.25 to 1/60 Hz depending of sensor size
Output MAG 8000	2 FW/RV/AI/CA (max. 50 Hz pulse rate)	2 FW/RV/AI/CA (max. 100 Hz pulse rate)
Communication	Add-on	Add-on
Data logger	Yes	Yes
Insulation test	No	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

Excitation frequency settings with mains power supply, see technical specifications for each version

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.



#### SIMATIC PDM

Details about the SIMATIC PDM tool can be found in chapter "Communication and Software" (see page 8/11).

## Battery-operated water meter MAG 8000

Technical specifications	
Transmitter	
Installation	Compact (integral)
	Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft)
Enclosure	Stainl. steel top housing (AISI 316) and coated brass bottom.
	Remote wall mount bracket in stainless steel (AISI 304).
Cable entries	2 x M20 (one gland for one cable of size 6 8 mm (0.02 0.026 ft) is included in the standard delivery)
Display	Display with 8 digits for main information. Index, menu and status symbols for dedicated information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Flow unit	
Europe US	Volume in m <sup>3</sup> and flow rate in m <sup>3</sup> /h Volume in Gallon and flow rate in GPM
Australia	Volume in MI and flow rate as MI/d
Optional display units	Volume: m <sup>3</sup> x 100, I x 100, G x 100, G x 1000, MG, CF x 100, CF x 1000, AF, AI, kI, BBL42
	Flow: m <sup>3</sup> /min, m <sup>3</sup> /d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d
Digital output	2 passive outputs (MOS), individual galvanically isolated
	Maximum load ± 35 V DC, 50 mA short circuit protected
Output A function	Programmable as pulse volume – forward – reverse – forward/net – reverse/net
Output B function	Programmable as pulse volume (like output A), alarm
Output	Max. pulse rate of 50 Hz (only Basic version) and 100 Hz (only Advanced version), pulse width of 5, 10, 50, 100, 500 ms
Communication	IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
Add-on modules	RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable
	<ul> <li>RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable</li> </ul>
	<ul> <li>Encoder interface module (for Itron 200WP) "Sensus protocol"</li> </ul>
	GSM/GPRS module with or without analog input cable
Power supply	Auto detection of power source with
Internal battery pack	display symbol for operation power. 1 D-Cell 3.6 V/16.5 Ah
External battery pack	2 D-Cell 3.6 V/33 Ah 4 D-Cell 3.6 V/66 Ah

Mains power supply	• 12 24 V AC/DC (10 32 V) 2 VA
	• 115 230 V AC (85 264 V) 2 VA
	Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack.
Cable	3 m (9.8 ft) for external connection to mains supply (without cable plug)
	mano cappi, (without cable plug)

## SITRANS F M

## Battery-operated water meter MAG 8000

Features	
Application identification	Tag number up to 15 characters
Time and date	Real time clock
Totalizer	
MAG 8000	3 totalizer: Configurable to Forward, Reverse and Bidirectional netflow
	1 totalizer (following totalizer 1 set- ting) resetable via display key
Measurement	
Low flow cut-off	0.05 % of Q3 free adjustable
Empty pipe detection	Symbolised in display
Data logger	Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	Active alarm is indicated on the display
Data protection	All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hour.
	Password protection of all parameters and hardware protection of calibration and revenue parameters.
Battery power management	Optimal battery information on remaining capacity.
	Calculated capacity includes all con- suming elements and available bat- tery capacity is adjusted related to change in ambient temperature.
	Numbers of power-ups
	Date and time registered for first and last time power alarm.
Diagnostic	
Continuous self test including	Coil current to drive the magnetic field
	Signal input circuit
	Data calculation, handling and storing
Alarm statistics and logging for fault analyzing	Electrode impedance to check actual media contact
	Flow simulation to check pulse and communication signal chain for correct scaling
	Number of sensor measurements (excitations)
	Transmitter temperature (battery capacity calculation)
	Low impedance alarm for change in media
	Flow alarm when defined high flow exceeds
	Verification mode for fast measure performance check

Insulation test (only Advanced version)	Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min.
Leakage detection (only Advanced version)	Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min and max values are stored with date registration. Last store value visible on the display.
Meter Utilization (only Advanced version)	6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of $\mathrm{Q}_{\mathrm{n}}$ (Q3)
Tariff (only Advanced version)	6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination.
	Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates.
	Tariff values visible on the display.
Settling date (only Advanced version)	On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values.
	Settling values visible on the display.
Statistic (only Advanced version)	Min. flow rate with time and date registration
	Max. flow rate with time and date registration
	Min. daily consumption with date registration
	Max. daily consumption with date registration
	Latest 7 days total and daily consumption
	Actual month consumption
	Latest month consumption
PC Configuration Software PDM	<ul> <li>Meter configuration – online and of- fline mode</li> </ul>
	Own parameter settings
	Parameter documentation
	<ul> <li>Print and export of data and parameters</li> </ul>
	PDM 6.0 Service Pack 2 – Basic and Online version

#### Battery-operated water meter MAG 8000

#### MAG 8000 water meter uncertainty

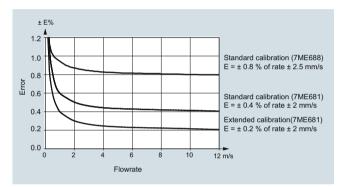
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m<sup>3</sup>/h to 10 000 m<sup>3</sup>/h.

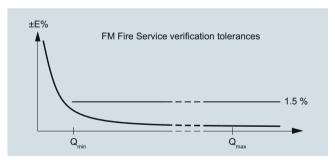
Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

The selected calibration determines the accuracy of the meter. A standard calibration results in max.  $\pm$  0.4 % uncertainty and an extended calibration  $\pm$  0.2 % (for MAG 8000 irrigation  $\pm$  0.8 %). A calibration certificate follows every sensor and calibration data are stored in the meter unit.



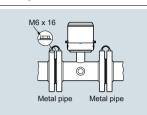
#### MAG 8000 (7ME6810) for Fire Service applications

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22



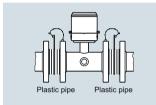
#### Grounding

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.



#### Metal pipes

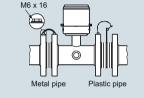
On metal pipes, connect the straps to both flanges.



#### Plastic pipes

On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends.

Grounding rings has to be ordered separately see "Grounding ring kit"



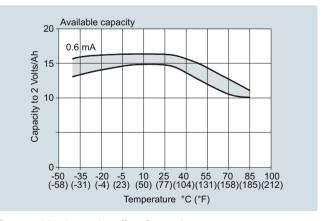
## Combination of metal and plastic pipes

A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.



The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity.



The graphic shows the effect from other temperatures. A variation in temperature from 15  $^{\circ}$ C to 55  $^{\circ}$ C (59 to 131  $^{\circ}$ F) reduces the capacity by 17  $^{\circ}$ from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table below.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

#### SITRANS F M

#### Battery-operated water meter MAG 8000

Scenario - Revenue application	Scenario - Revenue application					
Output A	Pulse rate max. 10 Hz					
Output B	Alarm or call-up					
Meter dialog	1 hour per month					
Add-com	None					
Temperature	• 5 % at 0 °C (32 °F)					
	• 80 % at 15 °C (59 °F)					
	<ul> <li>15 % at 50 °C (122 °F)</li> </ul>					

#### Battery lifetime (subject to the assumptions mentioned above)

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)								
Excitation frequency (	24 h operation)	1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	6.25 Hz
2 D-Cell battery 33 Ah Internal battery pack	DN 25 200 (1" 8")	8 years	8 years	6 years	40 months	8 months	4 months	2 months
	DN 250 600 (10" 24")	8 years	6 years	4 years	20 months	4 months	2 months	N/A
	DN 700 1 200 (28" 48")	6 years	4 years	2 years	1 year	2 months	N/A	N/A
4 D-Cell battery 66 Ah External battery pack	DN 25 200 (1" 8")	N/A	10 years	10 years	80 months	16 months	8 months	4 months
	DN 250 600 (10" 24")	N/A	10 years	10 years	40 months	8 months	4 months	N/A
	DN 700 1 200 (28" 48")	10 years	8 years	4 years	2 years	4 months	N/A	N/A

MAG 8000 for irrigation applications (7ME6880)								
Excitation frequency (	24 h operation)	1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	
1 D-Cell battery	DN 25 600 (1" 24")	52 months	40 months	25 months	12 months	2 months	1 month	
Internal battery pack	DN 700 1 200 (28" 48")	3 years	2 years	1 years	6 months	1 month	N/A	
2 D-Cell battery 33 Ah	DN 50 600 (2" 24")	8 years	80 months	50 months	24 months	4 months	2 months	
Internal battery pack	DN 700 1 200 (28" 48")	6 years	4 years	2 years	1 year	2 months	N/A	
4 D-Cell battery 66 Ah	DN 50 600 (2" 24")	10 years	10 years	8 years	48 months	8 months	4 months	
External battery pack	DN 700 1 200 (28" 48")	10 years	8 years	4 years	2 years	4 months	N/A	

MAG 8000 GSM/GPRS battery lifetime scenario							
Transmission once a day and MAG 8000 factory settings							
2 D-Cell battery 33 Ah Internal battery pack	3 years						
4 D-Cell battery 66 Ah Internal battery pack	7 years						

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories on page 3/137).

Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

- RS 232 at low excitation frequency to 10 % and at high excitation frequency to 80 % of calculated operation time
- RS 485 at low excitation frequency to 50 % and at high excitation frequency to 90 % of calculated operation time

#### MAG 8000 for abstraction and distribution network applications (7ME6810)

#### Overview



#### Benefits

#### Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply internal or external battery pack or mains power supply with battery back-up possibilities

## Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Up to 0.2 % maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

#### Intelligent information, easy to access

- · Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance GSM/GPRS module offers an efficient solution for remote measurement and monitor via wireless communication.

#### Technical specifications

Meter	
Accuracy	Standard calibration: ± 0.4 % of rate ± 2 mm/s
	Extended calibration DN 50 DN 300 (2" 12"): ± 0.2 % of rate ± 2 mm/s
Low flow cut-off (default)	0.05 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 +60 °C (-4 +140 °F)
Media	0 70 °C (32 158 °F)
Storage	-40 +70 °C (-40 +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH <sub>2</sub> O for six months
Certificates and approvals Calibration	
Standard calibration     Special calibration	$2\times25$ % and $2\times90$ % (default) 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$ 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$ Matched-pair calibration: default, 5-point, 10-point
Material certificate EN 10204-3.1	Available when ordering together with meter <sup>1)</sup>
Drinking water approvals	NSF/ANSI Standard 61 <sup>2)</sup> (cold water) USA WRAS (BS 6920 cold water) UK ACS Listed France DVGW W270 Germany Belgaqua (B)
Fire Service Approvals	MCERTS (GB)  FM Fire Service Meter (Class Number 1044) <sup>3)</sup>
Conformity	PED: 97/23EC <sup>4)</sup> For pressure/temperature curves see MAG 3100 on page 3/70.  EMC: IEC/EN 61326
Sensor version	DN 25 1200 (1" 48")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 μm/300 μm) Corrosivity category C4, according to ISO 12944-2
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
Battery-powered	DN 25 150 (1" 6"): 1/15 Hz DN 200 600 (8" 24"): 1/30 Hz DN 700 1200 (28" 48"): 1/60 Hz
Mains-powered	DN 25 150 (1" 6"): 6.25 Hz DN 200 600 (8" 24"): 3.125 Hz DN 700 1200 (28" 48"): 1.5625 Hz

## SITRANS F M

## MAG 8000 for abstraction and distribution network applications (7ME6810)

DN 25 150 (1" 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime)
DN 200 600 (8" 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)
DN 700 1200 (28" 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)
DN 25 150 (1" 6"): 6.25 Hz
DN 200 600 (8" 24"): 3.125 Hz
DN 700 1200 (28" 48"): 1.5625 Hz
DN 25 and DN 40 (1" and 1½"): PN 40 (580 psi)
DN 50 150 (2" 6"): PN 16 (232 psi)
DN 200 1200 (8" 48"): PN 10 or PN 16 (145 psi or 232 psi)
1" 24": 20 bar (290 psi)
28" 48": PN 10 (145 psi)
DN 50 1200 (2" 48"): PN 16 (232 psi)
EPDM
Hastelloy C276/2.4819
Grounding straps are premounted from the factory on each side of the sensor.

<sup>1)</sup> Has to be ordered with the meter. It is not possible to order the certificate afterwards.

<sup>2)</sup> Including Annex G

<sup>3)</sup> Not for sensors with 300 μm coating.

<sup>4)</sup> For further information on the PED standard and requirements see page 9/6.

#### MAG 8000 for abstraction and distribution network applications (7ME6810)

		W		_				
Selection and Ordering data		Art	icl	е	No	٥.		
SITRANS F M MAG 8000 water meter		7 N	ΙE	6	8 1	1 0	-	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.								
Diameter				Ī				
DN 25 (1")	•	2 D						
DN 40 (1½")	•	2 R						
DN 50 (2")	•	2 Y						
DN 65 (2½")	•	3 F						
DN 80 (3")	•	3 M	l					
DN 100 (4")		3 T						
DN 125 (5")		4 B						
DN 150 (6")		4 H						
DN 200 (8")		4 P						
DN 250 (10")	•	4 V						
DN 300 (12") DN 350 (14")		5 D 5 K						
DN 400 (16") DN 450 (18")		5 R						
DN 500 (20")		6 F						
DN 600 (24")		6 P						
DN 700 (28") <sup>1)</sup>		6 Y						
DN 750 (30") <sup>1)</sup>		7 D						
DN 800 (32") <sup>1)</sup>		7 H						
DN 900 (36") <sup>1)</sup>		7 M	l					
DN 1000 (40") <sup>1)</sup>		7 R						
DN 1050 (42") <sup>1)</sup>		7 U						
DN 1100 (44") <sup>1)</sup> DN 1200 (48") <sup>1)</sup>		7 V 8 B						
		0 0						
Flange norm and pressure rating EN 1092-1								
PN 10 (DN 200 1200 (8" 48"))			В					
PN 16 (DN 50 1200 (2" 48"))	•		С					
PN 16 non-PED (DN 700 1200 ( 28" 48"))			D					
PN 40 (DN 25 40 (1" 1½"))			F					
<u>ANSI B16.5</u> Class 150			١,					
AWWA C-207			J					
Class D (28" 48")			L					
<u>AS4087</u>								
PN 16 (DN 50 1200 (2" 48"))			N					
Sensor version EPDM liner and Hastelloy electrodes, 150 μm				3				
coating	_			٥				
EPDM liner and Hastelloy electrodes , 300 μm	•			4				
coating								
Calibration								
Standard ± 0.4 % of rate ± 2 mm/s Extended ± 0.2 % of rate ± 2 mm/s DN 50 300					1			
(2" 12")					_			
Region version								
Europe (m <sup>3</sup> , m <sup>3</sup> /h, 50 Hz)						1		
USA (Gallon, GPM, 60 Hz)						2		
Australia (MI, MI/d, 50 Hz)						3		
Transmitter type and installation								
Basic version integral on sensor							Α	
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs:								
• 5 m (16.4 ft)							В	
• 10 m (32.8 ft)	•						С	
• 20 m (65.6 ft)							D	
• 30 m (98.4 ft)							E	
Advanced version integral on sensor							K	

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	7 M E 6 8 1 0 -
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs:  • 5 m (16.4 ft)  • 10 m (32.8 ft)  • 20 m (65.6 ft)  • 30 m (98.4 ft)	L M N P
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU	В
(Terminated as end device) Serial RS 232 with Modbus RTU	С
Encoder interface with Sensus protocol	D
GSM/GPRS communication module with remote antenna; 5 m (16.4 ft) cable	S
GSM/GPRS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	Т
Power supply	_
Internal battery (no battery included)	0
Internal battery pack installed <sup>2)</sup>	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connec- tion (no battery included)	3
115 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	4
1) The Diameter DN 700 (28") to DN 1200 (48") is only as	vailable as remote

- 1) The Diameter DN 700 (28") to DN 1200 (48") is only available as <u>remote</u> transmitter type installation.
- transmitter type installation.

  2) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

#### Operating instructions for SITRANS F M MAG 8000

Description	Article No.	
• English	A5E03071515	
<ul> <li>German</li> </ul>	A5E00740986	
<ul> <li>Spanish</li> </ul>	A5E00741031	
• French	A5E00741021	

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\mbox{\sf F}$  literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

# Operating instructions for MAG 8000 GSM/GPRS communication module

Description	Article No.	
• English	A5E03644134	

## SITRANS F M

## MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Additional information		Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.		Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificate		G x 100	L46
Material certificate according to EN 10204-3.1	C12 <sup>1)</sup>	CF x 100 MG	L47 L48
Special calibration		G x 1000	L49
5-point calibration for DN 15 DN 200 <sup>2</sup> )	D01	CF x 1000	L50
5-point calibration for DN 250 DN 600 <sup>2)</sup> 5-point calibration for DN 700 DN 1200 <sup>2)</sup>	D02 D03	Al	L51
10-point calibration for DN 15 DN 200 <sup>3)</sup>	D06	kl	L52
10-point calibration for DN 250 DN 600 <sup>3)</sup>	D07	BBL42 (US oil barrel, 1 barrel = 42 US gallons)	L54
10-point calibration for DN 700 DN 1200 <sup>3)</sup>	D08	<b>Pulse set up</b> (default pulse A = forward and pulse B = Alarm, pulse	
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 DN 200	D11	width = 50 ms)	
Default (2 x 25 % and 2 x 90 %) match-pair calibration	D12	A function = RV, reverse flow	L62
for DN 250 DN 600	D40	A function = FWnet, forward net flow A function = RVnet, reverse net flow	L63 L64
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 DN 1200	D13	A function = Off	L65
5-point, matched-pair calibration for	D15	Volume per pulse $A = x \cdot 0.0001^{4}$	L70
DN 15 DN 200 <sup>2)</sup>	D16	Volume per pulse $A = x \cdot 0.001^{4}$	L71
5-point, matched-pair calibration for DN 250 DN 600 <sup>2)</sup>	D16	Volume per pulse $A = x \cdot 0.01^{4}$ Volume per pulse $A = x \cdot 0.1^{4}$	L72 L73
5-point, matched-pair calibration for	D17	Volume per pulse $A = x \cdot 3.1$	L74
DN 700 DN 1200 <sup>2)</sup>	D10	B function = FW, forward flow	L80
10-point, matched-pair calibration for DN 15 DN 200 <sup>3)</sup>	D18	B function = RV, verse flow	L81
10-point, matched-pair calibration for DN 250 DN 600 <sup>3)</sup>	D19	B function = FWnet, forward net flow	L82
10-point, matched-pair calibration for	D20	B function = RVnet, reverse net flow B function = Alarm	L83 L84
DN 700 DN 1200 <sup>3)</sup>	520	B function = Call up	L85
Flow unit		Volume per pulse $B = x \cdot 0.0001^{4}$	L90
l/s	L00	Volume per pulse B = $\times 0.001^{4}$	L91
MGD CFS	L01 L02	Volume per pulse B = $\times 0.01^4$	L92
l/min	L02	Volume per pulse B = $\times 0.1^{4}$ ) Volume per pulse B = $\times 1^{4}$ )	L93 L94
m <sup>3</sup> /min	L04	Data logger set up (default month logging)	
GPM	L05	DataloggerInterval = Daily	M31
CFM	L06	DataloggerInterval = Weekly	M32
l/h m <sup>3</sup> /h	L07 L08	Factory mounted cables	_
GPH	L09	5 m (16.4 ft) pulse cable A+B	M81
CFH	L10	5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
GPS	L11	20 m (65.6 ft) pulse cable A+B	M84
MI/d	L12	20 m (65.6 ft) communication cable RS 232/RS 485	M85
m <sup>3</sup> /d GPD	L13 L14	terminated as end device	Moz
BBL42/s	L14 L15	Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
BBL42/min	L16	Cello 2 channel, input cable 5 m (16.4 ft) with	M89
BBL42/h BBL42/d	L17 L18	MIL-C-26482 spec. connectors Encoder interface cable with connector for ITRON 200WP radio, lenght 25 ft	M90
Totalizer		Encoder interface cable with connector for ITRON	M91
Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)		200WP radio, length 5 ft SOFREL data logger cable 2 m with connector for	M92
Totalizer 1 = RV, reverse flow	L20	SOFREL GSM module	
Totalizer 1 = NET, net flow Totalizer 2 = FW, forward flow	L22 L30	FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
Totalizer 2 = NET, net flow	L31	DN 50, DN 80 and DN 100 (2", 3" and 4")	P20
Volume unit		DN 150 and DN 200 (6" and 8") DN 250 and DN 300 (10" and 12")	P21 P22
$m^3$	L40	,	1 44
MI	L41	<ol> <li>Under preparation</li> <li>20 %, 40 %, 60 %, 80 %, 100 % of factory Q<sub>max</sub></li> </ol>	
G	L42	3) Ascending and descending at 20 %, 40 %, 60 %, 80 %,	100 % of factory
AF	L43 L44	$Q_{max}$	
I x 100		4) Pulse width = 10 ms	

#### MAG 8000 CT for revenue and bulk metering (7ME6820)

#### Overview



#### Benefits

#### Approvals

- MI-001, OIML R 49/OIML R 49 MAA
- PTB K7.2
- FM Fire Service

#### Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply internal or external battery pack or mains power supply with battery back-up possibilities

#### Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

#### Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

## Technical specifications

Meter	
Accuracy	OIML R 49/OIML R 49 MAA for DN 50 DN 300 (2" 12"), Class I and II with turn down up to Q3/Q1 = 400 at Q2/Q1 = 1.6 MI-001 verification for DN 50 DN 400 (2" 16"), Class II with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6 FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") $\pm$ 1.5% ( $Q_{min}$ to $Q_{max}$ )
Low flow cut-off (default)	0.25 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 +60 °C (-4 +140 °F) MI-001: -25 +55 °C (-13 +131 °F)
Media	0.1 50 °C (32 122 °F)
Storage	-40 +70 °C (-22 +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH <sub>2</sub> O for six months
Certificates and approvals	
Calibration (standard) Material certificate EN 10204 3.1	2 x 25 % and 2 x 90 % Available when ordering together with meter <sup>1)</sup>
Drinking water approvals	NSF/ANSI Standard 61 <sup>2)</sup> (cold water) USA WRAS (BS 6920 cold water) UK ACS Listed France DVGW W270 Germany Belgaqua (B) MCERTS (GB)
Fire Service approval	FM Fire Service (1044) <sup>3)</sup>
Custody transfer approval	OIML R 49 and OIML R 49 MAA approval (DN 50 DN 300 (2" 12"))     MI-001 approval (DN 50 DN 600 (2" 24")) (DK-0200-MI-001-011)     PTB K7.2
Conformity	CEN EN 14154, ISO 4064 PED: 97/23/EC <sup>4)</sup> For pressure/temperature curves, see MAG 3100 on page 3/70. EMC: IEC/EN 61326
Sensor version	DN 50 600 (2" 24")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 μm/300 μm) Corrosivity category C4, according to ISO 12944-2
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	DN 50 450 (0" 0") 11511
<ul><li>Battery-powered</li><li>Mains-powered</li></ul>	DN 50 150 (2" 6"): 1/15 Hz DN 200 600 (8" 24"): 1/30 Hz DN 50 150 (2" 6"): 6.25 Hz DN 200 600 (8" 24"): 3.125 Hz

SITRANS F M

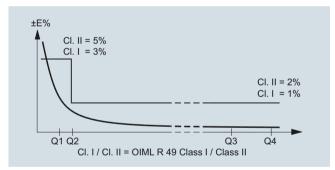
#### MAG 8000 CT for revenue and bulk metering (7ME6820)

Advanced version	
<ul><li>Battery-powered</li><li>Mains-powered</li></ul>	DN 50 150 (2" 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 600 (8" 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) DN 50 150 (2" 6"): 6.25 Hz DN 200 600 (8" 24"): 3.125 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 50 150 (2" 6"): PN 16 (232 psi) DN 200 300 (8" 12"): PN 10 or PN 16 (145 psi or 232 psi) up to DN 600 (24") in preparation
ANSI 16.5 Class 150	2" 12": 20 bar (290 psi) up to DN 600 (24") in preparation
AWWA C-207	28" 48": PN 10 (145 psi)
AS 4087	DN 50 300 (2" 12"): PN 16 (232 psi) up to DN 600 (24") in preparation
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor

- 1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
- 2) Including Annex G
- $^{3)}$  Not for sensors with 300  $\mu m$  coating.
- 4) For further information on the PED standard and requirements see page 9/6.

#### MAG 8000 CT (Revenue program) water meter type approval

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The Custody Transfer program is approved as Class I and Class II, for the sensor program from DN 50 to DN 300, at different Q3 and Q3/Q1. Q2/Q1 = 1.6 and follows OIML R 49 specification.



#### OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class I (1 %)<sup>1)</sup>

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	250	250	250	250	250	250	250	250	125	-	-	-	-	-
Q1 [m <sup>3</sup> /h]	0.25	0.40	0.63	1.00	160	2.50	4.00	6.40	12.8	-	-	-	-	-
Q2 [m <sup>3</sup> /h]	0.40	0.64	1.00	1.60	2.60	4.00	6.40	10.24	20.48	-	-	-	-	-
Q3 [m <sup>3</sup> /h]	63	100	160	250	400	630	1000	1600	1600	-	-	-	-	-
Q4 [m <sup>3</sup> /h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

#### OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class II (2 %)<sup>1)</sup>

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	400	400	400	400	400	400	400	400	200	-	-	-	-	-
Q1 [m <sup>3</sup> /h]	0.16	0.25	0.40	0.63	1.00	1.60	2.50	4.00	10.00	-	-	-	-	-
Q2 [m <sup>3</sup> /h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	16.00	-	-	-	-	-
Q3 [m <sup>3</sup> /h]	63	100	160	250	400	630	1000	1600	1600	-	-	-	-	-
Q4 [m <sup>3</sup> /h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

<sup>1)</sup> The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables

### MAG 8000 CT for revenue and bulk metering (7ME6820)

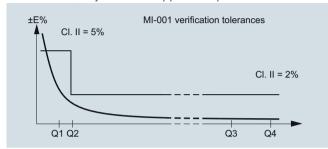
### MAG 8000 CT (Revenue program) MI-001

MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II aproval according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001 in the sizes from DN 50 to DN 400. The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production



MAG 8000 CT MI-001 verified and labeled products at a given Q3 and Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

7ME6820- xxxx1	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	1250	2000	3125
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630	1000	1000	1000	1600	2500
Q2 [m <sup>3</sup> /h]	0.96	1.60	2.60	4.03	6.40	10.24	16	25.60	38.4	64	64	64	102.4	160
Q1 [m <sup>3</sup> /h]	0.60	1	1.60	2.52	4	6.40	10	16	24	40	40	40	64	100
7ME6820-	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 450	DN 500	DN 600

7ME6820- xxxx2	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	3125	3125	5000
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630	1000	1000	2500	2500	4000
Q2 [m <sup>3</sup> /h]	0.41	0.63	1.02	1.60	2.54	4.06	6.35	10.16	16	25.4	25.4	63.49	63.49	101.6
Q1 [m <sup>3</sup> /h]	0.25	0.40	0.63	1	1.59	2.54	3.97	6.35	10	15.9	15.9	39.68	39.68	63.49

7ME6820- xxxx3	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Q4 [m <sup>3</sup> /h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	5000	5000	7875
Q3 [m <sup>3</sup> /h]	16	25	40	63	100	160	250	400	630	1000	1000	4000	4000	6300
Q2 [m <sup>3</sup> /h]	0.32	0.50	0.80	1.20	2	3.20	5	8	12.6	20	20	80	80	126
Q1 [m <sup>3</sup> /h]	0.20	0.31	0.50	0.75	1.25	2	3.13	5	7.88	12.5	12.5	50	50	78.75

7ME6820- xxxx4	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	160	160	160	160	160	160	160	160	160	160	160	-	160	-
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	2000	2000	2000	-	7875	-
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	1600	1600	1600	-	6300	-
Q2 [m <sup>3</sup> /h]	0.40	0.63	1	1.60	2.50	4	6.30	10	16	16	16	-	63	-
Q1 [m <sup>3</sup> /h]	0.25	0.39	0.63	1	1.56	2.50	3.94	6.25	10	10	10	-	39.38	-

7ME6820- xxxx5	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	200	200	200	200	200	200	200	200	-	-	-	-	-	-
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	-	-	-	-	-	-
Q2 [m <sup>3</sup> /h]	0.32	0.50	0.80	1.28	2	3.20	5.04	8	-	-	-	-	-	-
Q1 [m <sup>3</sup> /h]	0.20	0.32	0.50	0.80	1.25	2	3.15	5	-	-	-	-	-	-

SITRANS F M

### MAG 8000 CT for revenue and bulk metering (7ME6820)

7ME6820- xxxx6	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
"R" Q3/Q1	250	250	250	250	250	250	250	250	-	-	-	-	-	-
Q4 [m <sup>3</sup> /h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m <sup>3</sup> /h]	40	63	100	160	250	400	630	1000	-	-	-	-	-	-
Q2 [m <sup>3</sup> /h]	0.26	0.40	0.64	1.02	1.60	2.56	4	6.40	-	-	-	-	-	-
Q1 [m <sup>3</sup> /h]	0.16	0.25	0.40	0.64	1	1.60	2.52	4	-	-	-	-	-	-

The Label is placed on the side of the encapsulation. An example of the product label is shown below:



### Installation conditions

Please refer to "System information SITRANS F M electromagnetic flowmeters".

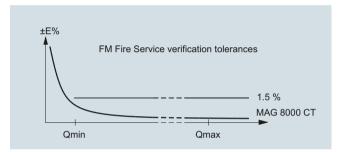
#### Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

### MAG 8000 CT (7ME6820) for Fire Service applications

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



### MAG 8000 CT for revenue and bulk metering (7ME6820)

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7 M E 6 8 2 0 -
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 50 (2") DN 65 (2½") DN 80 (3")	2 Y 3 F 3 M
DN 100 (4") DN 125 (5") DN 150 (6")	3 T 4 B 4 H
DN 200 (8") DN 250 (10") DN 300 (12")	4 P 4 V 5 D
DN 350 (14") <sup>1)</sup> DN 400 (16") <sup>1)</sup> DN 450 (18") <sup>1)</sup>	5 K 5 R 5 Y
DN 500 (20") <sup>1)</sup> DN 600 (24") <sup>1)</sup>	6 F 6 P
Flange norm and pressure rating	
<u>EN 1092-1</u> PN 16	С
ANSI B16.5 Class 150	J
<u>AS4087</u> PN 16	N
Sensor version EPDM liner and Hastelloy electrodes,	0
150 μm coating EPDM liner and Hastelloy electrodes, 300 μm coating	4
Approval/Verification <sup>3)</sup>	
Without verification according to OIML R 49 <sup>4)</sup> MI-001 Q3/Q1 = 25	0
MI-001 Q3/Q1 = 23 MI-001 Q3/Q1 = 63	2
MI-001 Q3/Q1 = 80	3
MI-001 Q3/Q1 = 160 MI-001 Q3/Q1 = 200	4 5
MI-001 Q3/Q1 = 250	6
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 100)	7
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 250)	8
Region version	
Europe (m <sup>3</sup> , m <sup>3</sup> /h, 50 Hz) USA (m <sup>3</sup> , m <sup>3</sup> /h, 60 Hz)	1 2
Transmitter type and installation	
Basic version integral on sensor Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs	A
5 m (16.4 ft) 10 m (32.8 ft)	B C
20 m (65.6 ft)	D
30 m (98.4 ft)  Advanced version integral on sensor	E K
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft) 10 m (32.8 ft)	L M
20 m (65.6 ft) 30 m (98.4 ft)	N P
/>	

	•
Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and	7 M E 6 8 2 0 -
Hastelloy electrodes	
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	В
Serial RS 232 with Modbus RTU	C
Encoder interface for ITRON 200WP radio with "Sensus" protocol"	D
GSM/GPRS module without analog inputs cable	S
GSM/GPRS module with analog inputs cable	Т
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed <sup>2)</sup>	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection. (no battery included)	4

- 1) Under preparation.
- Under preparation.
   Lithium batteries are subject to special transportation regulations according to United Nations 'Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- 3) For more details and references of the ranges please see the tables on pages 3/126 to 3/128.
- 4) Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.

### Operating instructions for SITRANS F M MAG 8000

Description	Article No.
English	A5E03071515
German	A5E00740986
Spanish	A5E00741031
French	A5E00741021

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:

http://www.siemens.com/flowdocumentation

# Operating instructions for MAG 8000 GSM/GPRS communication module

Description	Article No.	
English	A5E03644134	

# SITRANS F M

# MAG 8000 CT for revenue and bulk metering (7ME6820)

	0 1 1
Selection and Ordering data	Order code
Additional information  Please add "-Z" to Article No. and specify Order	
code(s) and plain text.	2 ( 2 1 )
Material certificate according to EN 10204-3.1	C12 <sup>1)</sup>
FP2E marking (France only)	C17
<b>Totalizer</b> Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow Totalizer 1 = NET, net flow Totalizer 2 = FW, forward flow Totalizer 2 = NET, net flow	L20 L22 L30 L31
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow A function = FWnet, forward net flow A function = RVnet, reverse net flow A function = Off	L62 L63 L64 L65
Volume per pulse $A = x \cdot 0.001^{2}$ ) Volume per pulse $A = x \cdot 0.01^{2}$ ) Volume per pulse $A = x \cdot 0.1^{2}$ ) Volume per pulse $A = x \cdot 1^{2}$ )	L71 L72 L73 L74
B function = FW, forward flow B function = RV, reverse flow B function = FWnet, forward net flow	L80 L81 L82
B function = RVnet, reverse net flow B function = Alarm B function = Call up	L83 L84 L85
Volume per pulse B = $\times 0.001^{2}$ Volume per pulse B = $\times 0.01^{2}$	L91 L92
Volume per pulse B = $\times 0.1^{2}$ Volume per pulse B = $\times 1^{2}$	L93 L94
Data logger set up (default month logging)	-
DataloggerInterval = Daily DataloggerInterval = Weekly	M31 M32
Factory mounted cables	-
5 m (16.4 ft) pulse cable A+B 5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M81 M82
20 m (65.6 ft) pulse cable A+B 20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M84 M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors 5 ft. Encoder interface cable with connector for	M89 M91
ITRON 200WP radio 25 ft. Encoder interface cable with connector for	M90
ITRON 200WP radio SOFREL data logger cable 2 m with connector for SOFREL GSM module	M92
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges) DN 50, DN 80 and DN 100 (2", 3" and 4") DN 150 and DN 200 (6" and 8") DN 250 and DN 300 (10" and 12")	P20 P21 P22

<sup>1)</sup> Under preparation

<sup>2)</sup> Pulse width = 10 ms

### MAG 8000 for irrigation applications (7ME6880)

# Overview



# Benefits

- IP68/NEMA 6P rating with tamper proof
- Flexible power supply internal or external battery pack or mains power supply with battery back-up possibilities
- No moving parts in a robust construction means less wear and tear.
- Up to 8 years maintenance-free operation in typical application
- Connectable to AMR systems
- Adaptor for conduit installation to provide a clean, protected pathway for device cables

# Technical specifications

recillical specifications	
Meter	
Accuracy	± 0.8 % ± 2.5 mm/s ± 0.4 % ± 2.5 mm/s NMI (class 2.5)
Low flow cut-off (default)	1.0 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 +60 °C (-4 +140 °F)
Media	0 70 °C (32 158 °F)
Storage	-40 +70 °C (-40 +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH <sub>2</sub> O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 $\rm mH_2O$ for six months
Approvals	
Drinking water approvals	• ANSI/NSF 61 <sup>1)</sup> (cold water) USA
	WRAS (BS 6920 cold water) UK
Custody transfer approval	NMI10 Australia
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 μm/300 μm) Corrosioty category C4, according
Conformity	to ISO 12944-2
Conformity	IEC/EN 61326
Flanges EN 1092-1 (DIN 2501) PN 10 drilled pattern	DN 50 600 (2" 24") (max. pressure 7 bar (101.5 psi))
ANSI 16.5 Class 150 drilled pattern	2" 24" (max. pressure 7 bar (101.5 psi))
AS 2091-1 Table D drilled pattern	DN 50 600 (2" 24") (max. pressure 7 bar (101.5 psi))
AS 2129	DN 25, DN 40, DN 125 (1", 1½", 5")
AS 4087 PN 16	DN 50 DN 1200 (2" 48")
Excitation frequency	
Battery-powered	DN 50 600 (2" 24"): 1/15 Hz
	DN 700 1200 (28" 48"): 1/60 Hz
Mains-powered	DN 50 600 (2" 24"): 3.125 Hz
	DN 700 1200 (28" 48"): 1.5625 Hz
Liner	Ebonite
Electrodes	Stainless steel

<sup>1)</sup> Including Annex G

SITRANS F M

### MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	7ME6880 -
including factory-mounted grounding rings	7 M 2 0 0 0 0
Diameter	
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5") DN 150 (6")	4 B 4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18") DN 500 (20")	5 Y 6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 750 (30")	7 D
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
DN 1050 (42") DN 1100 (44")	7 U 7 V
DN 1200 (44°)	8 B
Flange norm and pressure rating	
EN 1092-1 drilled pattern PN 10/max. 7 bar (101 psi)	В
ANSI B16.5 drilled pattern Cl 150/max. 7 bar (101 psi)	J
AS2129 drilled pattern table D/max. 7 bar (101 psi)	M
AS2129 table E (DN 25, DN 40, DN 125) AS4087 PN 16 (DN 50 DN 1200)	G N
Sensor version	
Ebonite liner and stainless steel electrodes	4
Calibration	
± 0.8 %, ± 2.5 mm/s	o
± 0.4 %, ± 2.5 mm/s	1
NMI (2.5 %)	3
Region version	
Europe (m <sup>3</sup> , m <sup>3</sup> /h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz) Australia (Ml, Ml/d, 50 Hz)	2 3
Transmitter type and installation	3
Basic version integral on sensor	А
Basic version, remote cables mounted on sensor	^
with IP68/NEMA 6P plugs	
2 m (6.56 ft)	T
5 m (16.4 ft) 10 m (32.8 ft)	B C
20 m (65.6 ft)	D
30 m (98.4 ft)	E

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	7 M E 6 8 8 0 -
including factory-mounted grounding rings	
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	В
Serial RS 232 with Modbus RTU	C
Encoder inferface GSM module with remote antenna and 5 m (16.4 ft)	D S
cable	3
GSM module with analog input, remote antenna and 5 m (16.4 ft) cable	Т
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed 2 D-cell <sup>1) 2)</sup>	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup	3
and 3 m (9.8 ft) power cable for external connection (no battery included)	
115 230 V AC power supply with battery backup	4
and 3 m (9.8 ft) power cable for external connec-	
tion (no battery included) Internal battery pack installed 1 D-cell <sup>1) 2)</sup>	5
internal battery paori installed 1 D ooli	J

<sup>1)</sup> Lithium batteries are subject to special transportation regulations according to United Nations 'Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

### Operating instructions for SITRANS F M MAG 8000

Description	Article No.	
English	A5E03071515	
German	A5E00740986	
<ul><li>Spanish</li></ul>	A5E00741031	
• French	A5E00741021	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

<sup>&</sup>lt;sup>2)</sup> Can be ordered by US region only.

# MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Flow unit	
l/s	L00
MGD	L01
CFS	L02
l/min	L03
m <sup>3</sup> /min	L04
GPM	L05
CFM	L06
l/h	L07
m <sup>3</sup> /h	L08
GPH	L09
CFH	L10
GPS	L11
MI/d	L12
m <sup>3</sup> /d	L13
GPD	L14
Totalizer	_
Volume calculation (default totalizer 1= forward and	
totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow Totalizer 2 = NET, net flow	L30 L31
Volume unit	
m <sup>3</sup>	L40
MI	L41 L42
G	
AF	L43
l x 100 m <sup>3</sup> x 100	L44 L45
G x 100 CF x 100	L46 L47
MG	L48
G x 1000	L49
CF x 1000	L50
Al	L51
kl	L52
Pulse set up	_
(default pulse A = forward and pulse B = Alarm, pulse	
width = $50 \text{ ms}$ )	
A function = RV, reverse flow	L62
A function = FWnet, forward net flow A function = RVnet, reverse net flow	L63 L64
A function = Avriet, reverse her now  A function = Off	L65
Volume per pulse $A = x \cdot 0.0001^{1}$ Volume per pulse $A = x \cdot 0.001^{1}$	L70 L71
Volume per pulse $A = x \cdot 0.001$	L72
Volume per pulse $A = x \cdot 0.1^{1}$	L73
Volume per pulse $A = x 1^{1}$	L74
Pulse A pulse width 5 ms (volume per pulse x 1)	L75
Pulse A pulse width 10 ms (volume per pulse x 1)	L76
Pulse A pulse width 50 ms (volume per pulse x 1)	L77
Pulse A pulse width 100 ms (volume per pulse x 1)	L78
Pulse A pulse width 500 ms (volume per pulse x 1)	L79
B function = FW, forward flow	L80
B function = RV, verse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm B function = Call up	L84 L85
5 tanodon – Odn up	

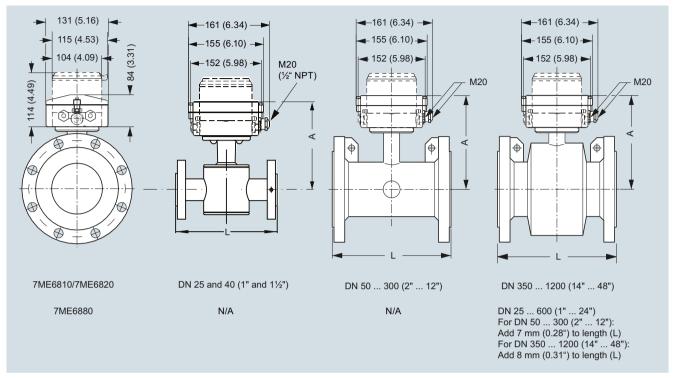
Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Volume per pulse $B = x \cdot 0.0001^{1}$ ) Volume per pulse $B = x \cdot 0.001^{1}$ ) Volume per pulse $B = x \cdot 0.01^{1}$ )	L90 L91 L92
Volume per pulse B = $\times 0.1^{1}$ ) Volume per pulse B = $\times 1^{1}$ )	L93 L94
Device operation	_
Only operator menu activated	M11
Data logger set up (default month logging)	_
DataloggerInterval = Daily DataloggerInterval = Weekly	M31 M32
Factory mounted cables	_
5 m (16.4 ft) pulse cable A+B 5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M81 M82
20 m (65.6 ft) pulse cable A+B 20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M84 M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector Cello 2 channel, input cable 5 m (16.4 ft) with	M87 M89
MIL-C-26482 spec. connectors 5 ft Encoder interface cable with connector for ITRON 200WP radio	M91
25 ft Encoder interface cable with connector for ITRON 200WP radio	M90
SOFREL data logger cable 2 m with connector for SOFREL GSM module Adaptors for conduit installation	M92 M94
Adaptors for conduit installation	IVIJ4

<sup>1)</sup> Pulse width = 10 ms

SITRANS F M

### Battery-operated water meter MAG 8000

# Dimensional drawings



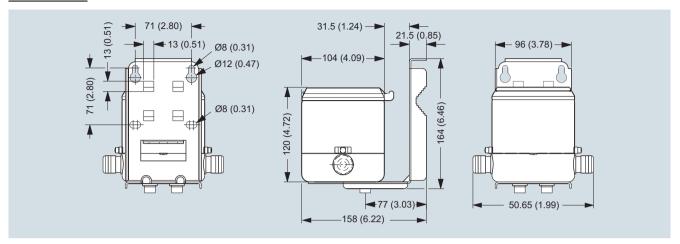
Dimensions in mm (inch)

Nominal DN size	A	L, lenghts							Weigh	ոt <sup>1)</sup>
	EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/ PN 16 non-PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWWA C-207 Class D	AS 2129 Table E		
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	mm	kg	lb
25 (1)	188 (7.4)	-	-	200	7.9	200	-	200	6	13
40 (1½)	203 (8.0)	-	-	200	7.9	200	-	200	9	20
50 (2)	178 (7.0)	-	200	-	7.9	200	-	-	11	25
65 (2½)	181 (7.1)	-	200	-	7.9	200	-	-	13	29
80 (3)	191 (7.5)	-	200	-	7.9	200	-	-	15	34
100 (4)	197 (7.8)	-	250	-	9.8	250	-	-	17	38
125 (5)	210 (8.3)	-	250	-	9.8	250	-	250	22	50
150 (6)	224 (8.8)	-	300	-	11.8	300	-	-	28	63
200 (8)	249 (9.8)	350	350	-	13.8	350	-	-	50	113
250 (10)	276 (10.9)	450	450	-	17.7	450	-	-	71	160
300 (12)	303 (11.9)	500	500	-	19.7	500	-	-	88	198
350 (14)	365 (14.4)	550	550	-	21.7	550	-	-	127	279
400 (16)	391 (15.4)	600	600	-	23.6	600	-	-	145	318
450 (18)	421 (16.6)	600	600	-	23.6	600	-	-	175	384
500 (20)	447 (17.6)	600	600	-	26.8	600	-	-	225	494
600 (24)	497 (19.6)	600	600	-	32.3	600	-	-	340	747
700 (28)	548 (21.6)	700	875/700	-	N/A	700	700	-	316	694
750 (30)	573 (22.6)	N/A	N/A	-	N/A	N/A	750	-	N/A	N/A
800 (32)	603 (23.7)	800	1000/800	-	N/A	800	800	-	398	1045
900 (36)	656 (25.8)	900	1125/900	-	N/A	900	900	-	476	1045
1000 (40)	708 (27.9)	1000	1250/1000	-	N/A	1000	1000	-	602	1322
1050 (42)	708 (27.9)	N/A	N/A	-	N/A	N/A	1050	-	N/A	N/A
1100 (44)	759 (29.9)	N/A	N/A	-	N/A	N/A	1100	-	N/A	N/A
1200 (48)	814 (32.0)	1200	1500/1200	-	N/A	1200	1200	-	887	1996

 $<sup>^{1)}</sup>$  For remote version the sensor weight is reduced with 2 kg (4.5 lb)

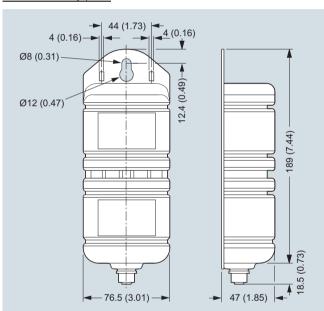
# Battery-operated water meter MAG 8000

### Remote version



Dimensions in mm (inch), weight 3.5 kg (8 lb)

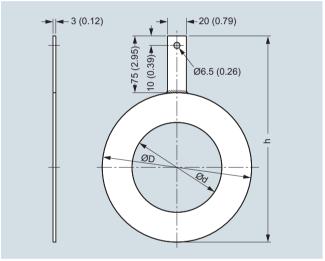
### External battery pack



Dimensions in mm (inch), weight 2.0 kg (4.5 lb)

Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

### Grounding rings



Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

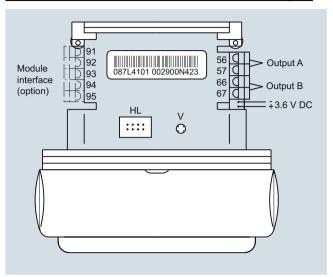
•			
Dimension	Internal diameter (d)	Outside diameter (D)	h
DN 25	27	68	143
DN 40	38	88	163
DN 50	52	100	175
DN 65	64	120	195
DN 80	79	133	208
DN 100	95	158	233
DN 125	115	188	263
DN 150	145	216	291
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

SITRANS F M

### Battery-operated water meter MAG 8000

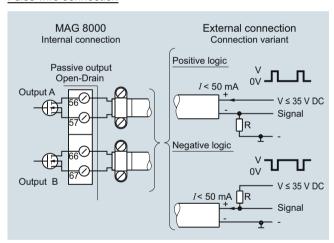
### Schematics

Electrical installation and pulse output - Connection diagram



HL = Hardware lock key connection V = Push button for verification mode

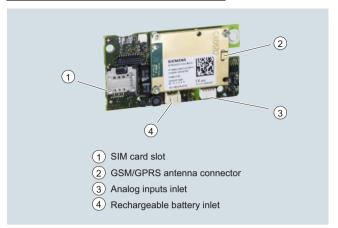
### Pulse wire connection



The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic. R = pull up/down is selected in relation to the Vx power supply and with a max. current I of 50 mA.

Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).

### Electrical installation of GSM/GPRS module



# Battery-operated water meter MAG 8000

Accessories Description	Artiolo No		Description	۸۳	rtiolo No	
	Article No.		Description COM/CDDC		ticle No.	
PC Flow Tool on CD (Download for free from www.siemens.com/flow)	FDK:087L6001		MAG 8000 GSM/GPRS communication module. Rechargeable battery, antenna and analog cable input must be ordered sep-	A5	5E03412758	Section 1 Sectio
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	FDK:087L4163		One cable entry 6 8 mm (0.24 0.31 ")	• FD	DK:087L4196	
Battery backup for mains power supply, 1 pc. D-cell (3.6 V, 16.5 Ah) <sup>1)</sup>	A5E03354392	See C JA VOLTS	M20 brass glands package <sup>2)</sup> (1 pc)		DV-0071 4154	
Rechargeable Lithium battery for MAG 8000 GSM/GPRS communication module <sup>1)</sup>	A5E03436686		One cable entry 2 5 mm (0.08 0.20 ") M12 brass glands with M20 reduction <sup>2)</sup> . Package of 10 pcs	F	OK:087L4154	(a)
Internal battery pack, one set of 2 D-cell (3.6 V, 33 Ah) and accessories for replacement 1, incl. NBR	FDK:087L4150		One cable entry 6 8 mm (0.24 0.31 ") M20 brass glands package <sup>2)</sup> (10 pcs) One cable entry 8 11 mm		DK:087L4155 DK:087L4156	
O-ring			(0.31 0.43 ") M20 brass glands package <sup>2)</sup> (10 pcs)			
External battery pack IP68/NEMA 6P with connector, 4 D-cell (3.6 V, 66 Ah) <sup>1)</sup> .	FDK:087L4151	4	One cable entry 11 15 mm (0.43 0.59 ") M20 brass glands package <sup>2)</sup> (10 pcs)	FD	OK:087L4157	
Order cable FDK:087L4152 separately.		3	Two cable entries 3.5 5 mm (0.14 0.20 ") M20 brass glands package <sup>2)</sup> (10 pcs)	FD	OK:087L4158	
Mains power supply 12 24 V AC/DC (average power consumption during line ≤ 0.1 VA) with battery backup and 3 m (9.8 ft)	FDK:087L4210		Two cable entries 5.5 7.5 mm (0.22 0.30 "), M20 brass glands package <sup>2)</sup> (10 pcs)	FD	OK:087L4159	
power cable for external connection (no battery included)			High gain antenna for MAG 8000 GSM/GPRS (PVC, IP68, cable length 5 m (16.4 ft), with SMA	● A5	5E03436689	
Temperature range: Fixed laying: -40 +90 °C (-40 +194 °F) Flexible application:			male connector (type RG 58) and internal SMA to SMP female cable adapter, and single entry cable			
-30 +80 °C (-22 +176 °F)			gland)  Analog input cable for MAG 8000 GSM/GPRS (3 m	<b>A</b> 5	5E03436698	
115 230 V AC, 50/60 Hz, with battery backup up and 3 m (9.8 ft) power cable for external connection (no bat- tery included)	FDK:087L4211		(9.8 ft) cable with M12 con- nector A-Coding female 5 pins, and two-entry cable gland)			
RS 232 add-on module, point to point communica- tion interface with Modbus RTU protocol	FDK:087L4212		Potting kit for terminal box of flow sensors for IP68/NEMA 6P	• FD	DK:085U0220	Want of F
RS 485 add-on module, multidrop communication interface with Modbus RTU protocol	FDK:087L4213		MAG 8000 Hardware key to access protected parameters	• FD	OK:087L4165	
Encoder interface module, with "Sensus" protocol for ITRON 200WP and 100W radio	A5E02475650		ters  MAG 8000 demo - training	FD	OK:087L4080	9383
			unit pack operating on Alka- line batteries. Transmitter with Flow tool CD, IrDA interface adapter and hard- ware key (No dangerous goods limitations)	, 2		

### SITRANS F M

### Battery-operated water meter MAG 8000

Description	Article No.	
Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah) (No dangerous goods limi- tations)	FDK:087L4142	3V Acaline Battery Pack

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- 1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- $^{2)}\,$  For cable connection through MAG 8000 transmitter bottom part.

When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally.

Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

o o	O	
Dimension	Article No.	
DN 25	A5E01002946	
DN 40	A5E01002947	
DN 50	A5E01002948	
DN 65	A5E01002950	
DN 80	A5E01002952	
DN 100	A5E01002953	
DN 125	A5E01002954	
DN 150	A5E01002955	
DN 200	A5E01002957	
DN 250	A5E01002958	
DN 300	A5E01002962	

#### Spare parts

Description	Article No.	
MAG 8000 transmitter compact replacement kit <sup>1)</sup> . No battery included. System number specified by ordering.	FDK:087L4166	
MAG 8000 transmitter remote replacement kit <sup>1)</sup> . System number specified by ordering.	FDK:087L4202	
MAG 8000 (Advanced version) transmitter compact replacement kit <sup>1)</sup> . No battery included. No system number required.	FDK:087L4203	

Description	Article No.	
MAG 8000 (Advanced version) transmitter remote replacement kit <sup>1)</sup> . No battery included. No system number required.	FDK:087L4204	
MAG 8000 (Basic version) transmitter PCB replacement kit <sup>1)</sup> . No system number required.	A5E01171569	
MAG 8000 (Advanced version) transmitter PCB replacement kit <sup>1)</sup> . No system number required.	FDK:087L4168	
Enclosure top including plastic lid, screws and blank product label	FDK:087L4167	
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included); PE jacket, ambient temperature: -20 +60 °C (-4 +140 °F)	FDK:087L4152	0
5 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP and 100W radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	A5E02551263	<b>O.</b>
25 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	A5E02551182	

# Battery-operated water meter MAG 8000

Description	Article No.	
Service tool kit package with various component for service and replacement.	FDK:087L4162	10
		10
		10
		10
		20
		10
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - PG 13.5 <sup>2)</sup>	FDK:087L4108	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862482	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - PG 13.5 <sup>2)</sup>	FDK:087L4109	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - M20	A5E00862487	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - PG 13.5 <sup>2)</sup>	FDK:087L4110	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - M20	A5E00862492	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - PG 13.5 <sup>2)</sup>	FDK:087L4111	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862497	
10 m cable set with pre- mounted conduit adaptor	A5E33400834	
20 m cable set with pre- mounted conduit adaptor	A5E33400836	

MAG 8000 (7ME6880) grounding ring service kit, consisting of 2 pcs. grounding rings, screws and gaskets

A5E03082907 A5E03082908 A5E03082909	4
A5E03082908 A5E03082909	
A5E03082909	4
	١
A5E03082910	
A5E03082911	
A5E32877967	
A5E03082913	
A5E03082914	
A5E03082915	
A5E03082916	
A5E03082917	
A5E03082918	
A5E03082919	
A5E03082920	
A5E33474999	
A5E33475000	
A5E33475006	
A5E33475001	
A5E33475002	
A5E33475003	
A5E33475004	
A5E33475007	
A5E33475008	
A5E33475009	
A5E33475010	
A5E33475011	
A5E33475012	
A5E34240921	
A5E33475013	
A5E33475014	
A5E33414889	
A5E33414890	
A5E33414891	
A5E33414892	
A5E33414893	
	A5E32877967 A5E03082913 A5E03082914 A5E03082915 A5E03082916 A5E03082917 A5E03082918 A5E03082919 A5E03082920  A5E33474999 A5E33475000 A5E33475001 A5E33475002 A5E33475003 A5E33475004 A5E33475008 A5E33475009 A5E33475010 A5E33475011 A5E33475011 A5E33475012 A5E33475012 A5E33475014 A5E33475014 A5E33475014 A5E33475014 A5E33475014 A5E33475014 A5E33414889 A5E33414889 A5E33414889 A5E33414890 A5E33414891 A5E33414892



<sup>1)</sup> Not applicable to Custody Transfer (CT) verified systems without re-verification

 $<sup>^{2)}\,</sup>$  For sensors produced before October 2007.

SITRANS F C

# System information SITRANS F C Coriolis mass flowmeters

# Overview



SITRANS F C Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

### Compatibility between transmitters and sensors

Transmitter	Page	Compact	Remote	Ex-Approval	Sensor	Page
FCT030	3/173	Yes	Yes	Yes	FCS400 Standard, DN 15 DN 80	3/163
		Yes	Yes	Yes	FCS400 Hygienic, DN 15 DN 80	3/163
		Yes	Yes	Yes	FCS400 NAMUR, DN 15 DN 80	3/163
FCT010 (only compact - FC410)	3/156	Yes	No	Yes	FCS400 Standard, DN 15 DN 80	3/163
		Yes	No	Yes	FCS400 Hygienic, DN 15 DN 80	3/163
		Yes	No	Yes	FCS400 NAMUR, DN 15 DN 80	3/163
MASS 6000 IP67 Polyamide enclosure	3/180	No	Yes	No	FCS200, DN 10 DN 25	3/203
		No	Yes	No	FC300, DN 4	3/212
		No	Yes	No	MASS 2100, DI 1.5	3/208
		Yes	Yes	No	MASS 2100, DI 3 DI 40	3/217
		No	Yes	No	MASS MC2, DN 100DN 150	3/228
		No	Yes	Yes	MASS MC2 Ex, DN 100DN 150	3/228
MASS 6000 19"	3/185	No	Yes	No	FCS200, DN 10 DN 25	3/203
		No	Yes	No	FC300, DN 4	3/212
		No	Yes	No	MASS 2100, DI 1.5	3/208
		No	Yes	No	MASS 2100, DI 3 DI 40	3/217
		No	Yes	No	MASS MC2, DN 100DN 150	3/228
		No	Yes	Yes	MASS MC2 Ex, DN 100DN 150	3/228
MASS 6000 Ex 19"	3/185	No	Yes	Yes	FCS200, DN 10 DN 25	3/203
		No	Yes	Yes	FC300, DN 4	3/212
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/208
		No	Yes	Yes	MASS 2100 Ex, DI 3 DI 40	3/217
MASS 6000 Ex d	3/194	No	Yes	Yes	FCS200, DN 10 DN 25	3/203
Stainless steel enclosure		No	Yes	Yes	FC300, DN 4	3/212
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/208
		Yes	Yes	Yes	MASS 2100 Ex, DI 3 DI 40	3/217
SIFLOW FC070 Standard	3/199	No	Yes	No	all	
SIFLOW FC070 Ex CT	3/199	No	Yes	Yes	all except MC2	

### System information SITRANS F C Coriolis mass flowmeters

### Benefits

### Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series

#### Easier commissioning

All SITRANS F C Coriolis flowmeters feature a sensor related memory unit SENSORPROM or SensorFlash which stores calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

#### Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

### Room for growth

#### • FC430:

Digital platform allows for any sensor in the range to be matched in compact or remote. The wide range of sensors are all certified to SIL2 or SIL3 (redundant) with the FCT030 transmitter in compact mode.

#### • MASS 6000:

USM II the Universal Signal Module with "plug & play" simplicity makes it easy to access and integrate the flowmeter with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.

#### • SIFLOW:

Direct integration into SIMATIC S7-300 systems as a flowmeter specific I/O module ensures fast and smooth startup, seamless integration, fast operation.

### Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio.

The main applications of the Coriolis flowmeter can be found in all industries, such as:						
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing					
Food and beverage	Dairy products, beer, wine, soft-drinks, "Plato/"Brix, fruit juices and pulps, bottling, CO <sub>2</sub> dosing, CIPliquids					
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots					
Oil and gas	Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG, well-head water-cut monitoring					
Water and waste water	Dosing of chemicals for water treatment					

SITRANS F C

# System information SITRANS F C Coriolis mass flowmeters

Please see Product selector



















tor www.pia-portal.automa- tion.siemens.com on the Internet, since some con- strains might be related to some of the features	10							A 70 A			
some of the reatures	FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
PIA-Selector®	7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Design											
Compact	•	•		•				•		•	
Remote	•		•	•	•	•	•	•	•	•	•
Transmitter enclosure											
Polyamide, IP67/NEMA 6								•			
Noryl (SIMATIC S7-300), IP20/NEMA 2											•
Stainless steel IP67/NEMA 6										•	
19" rack IP20/NEMA 2 aluminum									•		
Back of panel IP20 aluminum									•		
Wall mounting IP65 ABS plastic									•		
Front of panel IP65 ABS plastic									•		
Aluminium IP67	•	•									
Communication											
HART	•							•	•	•	
PROFIBUS PA								•	•	•	
PROFIBUS DP								•	•		
Modbus RTU/RS 485		•						•	•		•
Modbus RTU/RS 232											•
FOUNDATION Fieldbus H1								•	•	•	
DeviceNet								•	•		
Supply voltage											
24 V DC	•	•									•
24 V AC/DC								•	•	•	
115/230 V AC	•							•	•		
Pipe size											
DI 1.5 (1/16")			•	•							
DI 3 (1/8")					•						
DN 4 (1/6")					•						
DI 6 (¼")				•			•				
DN 10 (3/8")				•			•				
DI 15 (½")	•	•					•				
DN 15 (½")	•	•		•							
DI 25 (1")				•							
DI 40 (1½") DN 50 (2")	•	•									
DN 80 (3")	•	•									
DN 100 (4")						•					
DN 150 (6")						•					
Process connection norms	and press	ure									
Pipe thread	p. 000										
NPT ANSI/ASME B.20.1; PN 100	•	•	•	•	•						
NPT ANSI/ASME B.20.1; PN 350							•				
VCO	•	•					•				

ISO 228/1; PN 100 • = available

### System information SITRANS F C Coriolis mass flowmeters

Please see Product selec-

www.pia-portal.automa-tion.siemens.com **on the** Internet, since some con-strains might be related to























some of the features	FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
PIA-Selector®	7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Flange											
EN 1092-1 PN 40	•	•		•		•					
EN 1092-1 PN 100	•	•		•		● <sup>1)</sup>					
EN 1092-1 PN 160 <sup>7)</sup>	•	•				•					
	•			•							
ANSI B16.5 Class 150 ANSI B16.5 Class 300	•	•				•					
ANSI B16.5 Class 500 ANSI B16.5 Class 600	•	•		•		•1)					
						•''					
ANSI B16.5 Class 900 <sup>8)</sup>	•	•									
Dairy						4					
DIN 11851 PN 25	•	•		•		● <sup>1)</sup>					
DIN 11851 PN 40	•	•		•							
DIN 11864-1A	•	•									
DIN 11864-2A	•	•									
DIN 11864-3A	•	•									
Clamp ISO 2852 PN 16	•	•		•							
ISO 2853 PN 16	•	•		•							
DIN 32676 Tri-Clamp PN 10/PN 16	•					•					
Others on request	•	•	•	•	•	•					
Pipe material											
Stainless steel AISI 316L/1.4435	•	•	•	•	•						
Stainless steel AISI 316Ti/1.4571						•					
Hastelloy C22/2.4602	•	•	•	● <sup>4)</sup>	•		● <sup>6)</sup>				
Hastelloy C4/2.4610						•					
With heating jacket											
Internal U - tube				•							
External electric jacket	•	•									
Pressure rating											
PN 40	•	•		•		•					
PN 100	•	•	•	•	•	● <sup>1)</sup>					
PN 160	•	•									
PN 214							•				
PN 350							•				
High-pressure version <sup>2)</sup>			•	•	•						
Accuracy											
Flow error ≤ 0.1 % of rate	•	•	•	•	•						
Flow error ≤ 0.15 % of rate						•					
Flow error ≤ 0.5 % of rate							•				
Density error ≤ 0.0005 g/cm <sup>3</sup>				•							
Density error ≤ 0.001 g/cm <sup>3</sup>	•	•	•			•					
Density error ≤ 0.0015 g/cm <sup>3</sup>				●3)	•						
Cable glands											
PG 13.5									●5)		
/2" NPT	•	•						•			
MOO											

• = available

M20

- 1) Not available for DN 150 sensor.
- <sup>2)</sup> See technical specifications.
- 3) DI 3 and DI 6
- $^{\rm 4)}$  DI 15, DI 25 and DI 40 are not available for Hastelloy C22/2.4602.
- <sup>5)</sup> Only when mounted in enclosure.
- 6) Process connectors in AISI 316Ti/1.4571
- <sup>7)</sup> Sensor pressure limited to 100 bar (AISI 316L) and 160 bar (Hastelloy C22)
- 8) Sensor pressure limited to 100 bar (AISI 316L) and 150 bar (Hastelloy C22)

SITRANS F.C.

### System information SITRANS F C Coriolis mass flowmeters

Please see Product selector

www.pia-portal.automa-tion.siemens.com **on the** 

Internet, since some constrains might be related to some of the features





















FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120

PtA-Selector		7ME4713	7ME4711		7ME4200, 7ME4210							
Approvals												
Custody Transfer												
Compressed gaseous fuel measuring systems for vehicles - OIML R 139								•				●10)
Other media than water pattern approval - OIML R 117		•										
Harzardous locations												
ATEX		•	•	•	•	•	● <sup>9)</sup>	•		•	•	● <sup>3)4)</sup>
IECEx		•	•					•				• <sup>4)</sup>
FM		•	•					•				● <sup>9)</sup>
UL				● <sup>1)</sup>	● <sup>1)</sup>	•			● <sup>2)</sup>			
CSA		•	•									● <sup>4)</sup>
NEPSI		•	•					•				
INMETRO		•	•									
Ordinary locations												
USL, CNL-Flow- c- meter	·UL-us								● <sup>2)</sup>	● <sup>7)</sup>		
USR, CNR-Flow- c- meter	·UL-us								● <sup>2)</sup>	●5)6)		
PED												
Fluid group 1 PE Category II, Di Module H 97	ED rective 7/23/EC	•	•		•8)							
0/25 100 bar. Di	ED rective 7/23/EC						•					
CRN												
Category F OF10769.5C	CRN	•	•	•	●11)	•						
Pharma												
EHEDG	TUM	•	•									

Note: Special conditions for safe use might be specified in certificates or operating instructions.

- 1) Sensor pressure max. 100 bar (1450 psi)
- 2) Only remote version
- 2) Can be placed in zone 2 if mounted in minimum IP54 cabinet.

- 3) Can be placed in z 4) Only Ex version 5) 24 V; IP20 6) 115 ... 230 V; IP20 7) 115 ... 230 V; IP65 8) Only DI 25 and DI 40
- 9) For sizes ≥ DN 100 only
- 10) Install in Div. 2, sensor interface into Div. 1, only Ex CT version 11) Only DI 6 is CRN

#### System information SITRANS F C Coriolis mass flowmeters

### Function

The flow measuring principle is based on the Coriolis effect. The flowmeter consists of a system FC410 or FC430 or a combination of a sensor type MASS 2100/FC300/FCS200/MC2 and a transmitter type MASS 6000/SIFLOW FC070.

The SITRANS F C sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups.

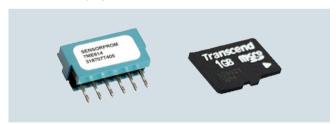
The temperature of the sensor is measured by a Pt1000. For MC2 the temperature is measured with a Pt100.

The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS F C transmitter for calculations of mass, volume, fraction, temperature and density.

The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has a built-in noise filter, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

For communication purposes the SITRANS F C MASS 6000 transmitters have a CAN interface with a Siemens specific protocol. This concept is known as the USM II (Universal Signal Module) concept. The idea is that extra output modules or communication modules can be connected to this bus, making it possible to configure the flowmeter for the precise task in hand. When the internal CAN bus detects the installed module, it is automatically programmed to factory settings via the SENSORPROM memory unit, and the new menu is visible in the MASS 6000 display.



SENSORPROM and SensorFlash flow memory units

FC410 flow transmitters communicate via Modbus RTU and FC430 via HART. Currently the USM platform handles all present and future communication protocols, e.g., PROFIBUS DP, PROFIBUS PA, HART, Modbus, FOUNDATION Fieldbus H1 and DeviceNet.

#### Integration

#### Installation of MASS 2100/FC300 and MC2 sensors

#### Installation requirements/System design information

The SITRANS F C mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 6 or IP65. The flowmeter is bidirectional and can be installed in any orientation, however, the sensor is not self-emptying in all positions.

It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur.

The corrosion resistance of the fluid-wetted materials must be evaluated.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The **Sizing Program** (download from https://pia.khe.siemens.com/index.aspx?nr=11501) can be used to calculate the pressure drop.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

#### Installation orientation

- FCS400 sensors
   The optimal installation orientation is vertical with flow upwards (liquids) and up to 10° off vertical for self-draining.
- MASS 2100/FC300 sensors
   The optimal installation orientation is horizontal.
- MC2 sensors
   The optimal installation orientation is vertical with the flow upwards.

#### **Supports**

 In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections. FCS400 sensors can be supported at the junction between the process connection and the main body of the sensor.

#### **Shut-off devices**

- To conduct a system zero adjustment, shut-off devices are required in the pipeline.
  - In horizontal installations at the outlet for FC300 and MC2 and the inlet for MASS 2100.
  - In vertical installations at the inlet.
- When possible, shut-off devices should be installed both upand downstream of the flowmeter. A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

#### Installation: straight run requirements

 The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

#### System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.

SITRANS F C

#### System information SITRANS F C Coriolis mass flowmeters

• When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

#### Zero adjustment

• In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to "ZERO" while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

### Technical specifications

#### Flowmeter uncertainty/specifications

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities accredited according to ISO/IEC 17025 by DANAK.

The accreditation body DANAK has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation -Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit. FC410 and FC430 meters have the calibration data written to the front end section. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

FCS400 sensors and FCT030/FCT010 transmitters

	5 %		50 %		100 %		
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)	
DN 15 (½")	185	(408)	1 850	(4 079)	3 700	(8 157)	
DN 25 (1")	575	(1 268)	5 750	(12 677)	11 500	(25 353)	
DN 50 (2")	2 600	(5 732)	26 000	(57 320)	52 000	(114 640)	
DN 80 (3")	6 800	(15 000)	68 000	(150 000)	136 000	(300 000)	

MASS 2100 sensors and MASS 6000 transmitters

	5 %		50 %		100 %	100 %		
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)		
DI 1.5 (1/16")	1.5	(3.3)	15	(33)	30	(66)		
DI 3 (1/8")	12	(26)	125	(275)	250	(550)		
DN 4 (1/6")	17.5	(38)	175	(386)	350	(770)		
DI 6 (¼")	50	(110)	500	(1 102)	1 000	(2 200)		
DI 15 (½")	280	(617)	2 800	(6 173)	5 600	(12 345)		
DI 25 (1")	1 250	(2 756)	12 500	(27 558)	25 000	(55 100)		
DI 40 (1½")	2 600	(5 732)	26 000	(57 320)	52 000	(114 600)		

#### MC2 sensors and MASS 6000 transmitters

	5 %		50 %		100 %		
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)	
DN 100 (4")	10 175	(22 432)	101 750	(224 320)	203 500	(448 640)	
DN 150 (6")	30 100	(66 359)	301 000	(663 590)	602 000	(1 327 181)	

- Q<sub>max</sub> (100%) is calibrated with water at:
   FCS400 sensors: a pressure drop of 1 bar (14.5 psi)
  - MASS 2100 sensors (all except Di 1.5): a flow speed of 10 m/s (Di 1.5: a flow speed of 4.7 m/s)
  - MC2 sensors: a pressure drop of 2 bar (29 psi).
- For flow > 5 % of the sensors max. flow rate, the error can be read directly from the curve below.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.
- The error curve is plotted from the formula:

$$E = \pm \sqrt{(Cal.)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

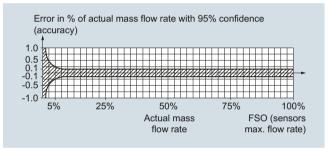
E = Error [%]

 $Z = Zero point error [kg/h]^{1)}$ 

gm = Mass flow [kg/h]

Cal. = Calibrated flow accuracy: 0.10 or 0.15

1) Zero point error for each sensor is shown in the tables below.



# Reference conditions for flow calibrations (ISO 9104 and DIN/EN

29104)	
Flow conditions	Fully developed flow profile
Temperature, medium	20 °C ± 2 °C (68 °F ± 3.6 °F)
Temperature, ambient	20 °C ± 2 °C (68 °F ± 3.6 °F)
Liquid pressure	2 ± 1 bar
Density	0.997 g/cm <sup>3</sup>
Brix	40 °Brix
Supply voltage	U <sub>n</sub> ±1 %
Warming-up time	30 min.
Cable length	5 m between transmitter and sensor

### Additions in the event of deviations from reference conditions

Current output

As pulse output ± (0.1% of actual flow +0.05 % FSO)

Effect of ambient temperature

• Display/frequency/pulse output:  $< \pm 0.003\%/K$  act.

 Current output: < ± 0.005 %/</li> K act.

< 0.005 % of measuring value on

Effect of supply voltage

1 % alteration

# System information SITRANS F C Coriolis mass flowmeters

Sensor type		FC300	MASS 2100					
Sensor size		DN 4 (1/6")	DI 1.5 (1/16")	DI 3 (1/8")	DI 6 (1/4")	DI 15 (½")	DI 25 (1")	DI 40 (1½")
Number of measuring pipes		1	1	1	1	1	1	1
Mass flow								
Linearity error	% of rate	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Repeatability error	% of rate	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Max. zero point error	[kg/h]	0.010	0.001	0.010	0.050	0.200	1.500	6.000
Density								
Density error <sup>1)</sup>	[g/cm <sup>3</sup> ]	0.0025 <sup>2)</sup>	0.001	0.0015	0.0015	0.0005	0.0005	0.0005
Repeatability error	[g/cm <sup>3</sup> ]	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001
Range	[g/cm <sup>3</sup> ]	0 2.9	0 2.9	0 2.9	0 2.9	0 2.9	0 2.9	0 2.9
Temperature								
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)
Brix								
Error	[°Brix]	0.3	0.2	0.3	0.3	0.1	0.1	0.1

Accuracy is only valid when sensor is density-calibrated.
 Hastelloy C22 version.

Sensor type		FCS400		MC2	MC2		
Sensor size		DN 15 (½")	DN 25 (1")	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Number of measur	ing pipes	2	2	2	2	2	2
Mass flow:							
Linearity error	% of rate	0.1	0.1	0.1	0.1	0.15	0.15
Reproducibility of flowrate at rates > 5 % of Q <sub>max</sub>	% of rate	0.05	0.05	0.05	0.05	0.1	0.1
Max. zero point error	[kg/h (lb/h)]	0.2 (0.44)	2 (4.41)	7.5 (16.5)	18.0 (39.7)	24.96 (55.03)	330 (727.53)
Density							
Density error	(Standard) [g/cm <sup>3</sup> ]	0.005	0.005	0.005	0.005	0.005	0.005
	(Extended) [g/cm <sup>3</sup> ]	0.001	0.001	0.001	0.001	0.001	Not available
Range	[kg/dm <sup>3</sup> ]	0.001 5.0	0.001 5.0	0.001 5.0	0.001 5.0	0.5 3.5	0.5 3.5
Repeatability error	[g/l]	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
Temperature							
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	1.0 (1.8)	1.0 (1.8)
Brix <sup>1)</sup>							
Error	[°Brix]	0.1	0.1	0.1	0.1	On request <sup>1)</sup>	Not available

 $<sup>^{1)}</sup>$  Flow and density calibration (1 kg/m $^{3}$ ) required. Brix/Plato and Fraction available as PVR.

### SITRANS F.C.

### System information SITRANS F C Coriolis mass flowmeters

### Technical specifications PROFIBUS PA/DP

General specifications	
PROFIBUS device profile	3.00 Class B
Certified	Yes, according to Profile for process control devices V3.00.
MS0 connections	1
MS1 connections	1
MS2 connections	2

### Electrical specification DP

Physical layer specifications				
Applicable standard	IEC 61158/EN 50170			
Physical Layer (Transmission technology)	RS 485			
Transmission speed	≤ 1.5 Mbit/s			
Number of stations	Up to 32 per line segment, (maximum total of 126)			
Cable specification (Type A)				
Cable design	Two wire twisted pair			
Shielding	CU shielding braid or shielding braid and shielding foil			
Impedance	35 up to 165 $\Omega$ at frequencies from 3 20 MHz			
Cable capacity	< 30 pF per meter			
Core diameter	> 0.34 mm <sup>2</sup> , corresponds to AWG 22			
Resistance	$<$ 110 $\Omega$ per km			
Signal attenuation	Max. 9 dB over total length of line section			
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters			

# Electrical specification PA Physical layer specifications

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment, maximum total of 126)
Max. basic current [IB]	14 mA
Fault current [I <sub>FDE</sub> ]	0 mA
Bus voltage	9 32 V (non Ex)
Preferred cable specification (Type A)	
	Two wire twisted pair
(Type A)	Two wire twisted pair 0.8 mm <sup>2</sup> (AWG 18)
(Type A) Cable design	· ·
(Type A) Cable design Conductor area (nominal)	0.8 mm <sup>2</sup> (AWG 18)
(Type A) Cable design Conductor area (nominal) Loop resistance	0.8 mm <sup>2</sup> (AWG 18) 44 Ω/km
(Type A) Cable design Conductor area (nominal) Loop resistance Impedance	0.8 mm <sup>2</sup> (AWG 18) 44 $\Omega$ /km 100 $\Omega$ ± 20 %
(Type A) Cable design Conductor area (nominal) Loop resistance Impedance Wave attenuation at 39 kHz	0.8 mm <sup>2</sup> (AWG 18) 44 $\Omega$ /km 100 $\Omega$ ± 20 % 3 dB/km

Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact mounted SITRANS F C MASS 6000 Ex d
FISCO	Yes
Max. U <sub>I</sub>	17.5 V
Max. I <sub>I</sub>	380 mA
Max. P <sub>I</sub>	5.32 V
Max. L <sub>I</sub>	10 μΗ
Max. C <sub>I</sub>	5 nF
Max. U <sub>o</sub>	1.3 V
Max. I <sub>o</sub>	50 μΑ
FISCO cable requirements	
Loop resistance R <sub>C</sub>	15 150 <b>Ω</b> /km
Loop inductance L <sub>C</sub>	0.4 1 mH/km
Capacitance C <sub>C</sub>	80 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

### PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.

MSO specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services:		
Input (Master view)	Parameter	MASS 6000
	Mass flow	✓
	Volume flow	✓
	Temperature	✓
	Density	✓
	Fraction A <sup>1)</sup>	✓
	Fraction B <sup>1)</sup>	✓
	Pct Fraction A <sup>1)</sup>	✓
	Totalizer 1	✓
	Totalizer 2 <sup>2)</sup>	✓
	Batch progress <sup>2)</sup>	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running)	✓
Output (Master view	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop)	✓
	Batch setpoint	1
	Batch compensation	1

<sup>1)</sup> Requires a SENSORPROM containing valid fraction data.

When ON, Batch progress is returned. When OFF, TOTALIZER 2 is returned.

Max. bus length

<sup>2)</sup> Value returned is dependent on the BATCH function.

### Flowmeter SITRANS FC430

### Overview



The complete flowmeter system SITRANS FC430 can be ordered for standard, hygienic or NAMUR service. All versions can be ordered for CT service, according to OIML R 117 (Liquids other than water).

SIL specified compact variants can be validated and configured for SIL 2 or SIL 3 operation. SIL 3 operation requires two flowmeters in series and monitored by a SIL-rated control system. Series mounting must not introduce cross-talk between the sensors. Refer to installation guidelines.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- · Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FC430 is available as standard with 4 to 20 mA analog output with HART 7.2. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC430 flowmeter system consists of a SITRANS FC5400 sensor and a SITRANS FCT030 transmitter.

#### Benefits

- It is narrow and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations
- Functional Safety (SIL X). Device suitable for use in accordance with IEC 61508 and IEC 61511.

Technical specifications	
Sizes	DN 15 (½"), DN 25 (1"), DN 50 (2"), DN 80 (3")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	DN 15: 3 700 kg/h (8 157 lb/h) DN 25: 11 500 kg/h (25 353 lb/h) DN 50: 52 000 kg/h (114 640 lb/h) DN 80: 136 000 kg/h (300 000 lb/h)
Architecture	Compact or remote configuration with selection of twelve languages includ- ing Chinese and Russian
Display	Full graphical display, 240 x 160 pixels
Power supply	20 27 V DC ± 10%; 100 240 V AC ± 10 %, 47 63 Hz ± 10%
Weight	4.6 50 kg
Material	
<ul><li>Sensor</li><li>Wetted parts</li><li>Enclosure</li><li>Transmitter</li></ul>	316L stainless steel or Hastelloy C22 304 stainless steel Aluminum with corrosion-resistant
	coating
Enclosure rating	IP67
Pressure ratings	
<ul><li>Measuring tubes</li><li>316L</li></ul>	100 bar (1450 psi)
- Hastelloy C22	160 bar (2321 psi)
Sensor enclosure	20 bar (DN15, DN 25) 17 bar (DN 50, DN 80)
• Sensor enclosure burst pressure	>160 bar (all sizes)
Temperature ratings	
Process medium	-50 +200 °C (-58 +392 °F)
Ambient	-40 +60 °C (-40 +140 °F)
Display	-20 +60 °C (-4 +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP), VCO Quick-connect
Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
Hygienic clamps	DIN 11864-3A, DIN 32676, ISO 2852
Approvals  • Hazardous area	ATEX, IECEx, FM, NEPSI, CSA, INMETRO
Pressure equipment	PED, CRN
Hygienic	3A, EHEDG
Custody transfer	OIML R 117
Operational safety	SIL 2 Single
(compact system only)	SIL 3 Redundant system
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
1/0	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART 7.2
EMC performance	EN 61326-3-2
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

# SITRANS F C

# Flowmeter SITRANS FC430

Selection and Ordering data		Δrticl	Δ NI	_	Orc	d. code	_
SITRANS FC430 Digital coriolis flowmeter	_	7ME				a. code	7
with SITRANS FCS400 Standard flow sen-							1
sor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter							
∠ Click on the Article No. for the online con figuration in the PIA Life Cycle Portal.	-						
Sensor size, connection size							
DN 15, DN 10 (½", 3/8") DN 15, DN 15 (½", ½")	•	3 F 3 G					
DN 15, DN 20 (½", ¾")	•	3 H					
DN 15, DN 25 (½", 1") DN 25, DN 15 (1", ½")		3 J 3 K					
DN 25, DN 45 (1", 72) DN 25, DN 25 (1", 1") DN 25, DN 40 (1", 1½")	•	3 L 3 N					
DN 50, DN 40 (2", 1½") DN 50, DN 50 (2", 2")	•	4 B 4 C					
DN 80, DN 65 (3", 2½")	•	4 J					
DN 80, DN 80 (3", 3") DN 80, DN 100 (3", 4")	•	4 K 4 L					
Process connection							
EN 1092-1 B1, PN 16 EN 1092-1 B1, PN 40		A A					
EN 1092-1 B1, PN 63	_	Ā					
EN 1092-1 B1, PN 100	•	A	3				
EN 1092-1 B1, PN 160		В	-				
EN 1092-1 D NUT, PN 40 EN 1092-1 D NUT, PN 63		A A					
EN 1092-1 D NUT, PN 100		A					
EN 1092-1 D NUT, PN 160		A	8				
ANSI B16.5-2009, class 150	•	D	1				
ANSI B16.5-2009, class 300		D					
ANSI B16.5-2009, class 600 ANSI B16.5-2009, class 900		D D					
ISO228-1 G pipe thread	•	E	1				
ASME B1.20.1 NPT pipe thread	•	E	3				
DIN 11851 hygienic screwed	•	F	1				
DIN 32676 hygienic Tri-Clamp	•	G	1				
DIN 11864-1A asceptic screwed	•	Н	1				
DIN 11864-2A asceptic flanged DIN 11864-3A clamped	•	H H					
ISO 2852 hygienic clamped	•	J	1				
ISO 2853 hygienic screwed		J	5				
SMS 1145 hygienic screwed		K					
12-VCO-4 quick connect JIS B2200:2004/10K		K L					
JIS B2220:2004/10K		Ĺ					
JIS B2220:2004/40K		L					
JIS B2220:2004/63K		L	7				
Wetted parts material							
AISI 316L/W1.4435/W1.4404 (100 barg max.) Hastelloy C22 (only for 7ME461)	•		1				
Calibration/Accuracy class				ĺ,			
0.1 % flow, 5 kg/m <sup>3</sup> density 0.1 % flow, 1 kg/m <sup>3</sup> density	•			1 4			
Standard fraction calibration	_			8			
Transmitter/DSL material & mounting style							
Compact, IP67, aluminum	•				D		
Remote, IP67, aluminum, M12	•				G		
Remote, IP67, aluminum, T/Box					K		

Selection and Ordering data	Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter	7 M E 4 6 1 3	-
with SITRANS FCS400 Standard flow sen- sor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		
Ex approval		
Non-Ex		Α
ATEX II 2GD ●		С
IECEx GDb		F
FM, Class 1, Div 1		Н
CSA, Class 1, Zone 1		M
Local User Interface		
Blind		1
Graphical, 240 x 160 pxl		3

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	•	A01
Metric, plastic	•	A02
Metric, brass/Ni plated		A05
Metric, stainless steel		A06
NPT, no glands		A11
NPT, Plastic		A12
NPT, brass/Ni plated		A15
NPT, stainless steel		A16
Sofware functions and CT approvals		
Standard	•	B11
CT standard		B31
I/O configuration Ch1		
Ca 4 20 mA HART active SIL certified	•	E04
Cp 4 20 mA HART passive SIL certified	•	E05
Ca 4 20 mA HART active	•	E06
Cp 4 20 mA HART passive	•	E07
Only compact versions can be used in SIL application	nns '	

# Flowmeter SITRANS FC430

Selection and Ordering data	Order code	Selection and Ordering	ng data	Order code
I/O configuration Ch2, Ch3 and Ch4		Add-on options an	nd accessories	
None	F00		icle No. and specify Order	
aSignal, None, None	F40	code(s).		
aSignal, aSignal, None	F41	Certificates		
aSignal, aSignal, aSignal	F42	Pressure test certificat	C01	
aSignal, aSignal, la aSignal, aSignal, R	F43 F44	r recours took continuate r EB		C02
aSignal, Ia, None	F45		C05	
aSignal, la, la	F46	Welding inspection rep Factory certificate to E	C07 C10	
aSignal, Ia, R	F47	Factory certificate to E		C11
aSignal, R, None	F50	Cable		
aSignal, R, R	F51	None		L50
pSignal, None, None pSignal, pSignal, None	F60 F61	5 m (16.4 ft), standard	with M12 plugs fitted	L51
pSignal, pSignal, pSignal	F62	5 m (16.4 ft), standard		L52
pSignal, pSignal, Ip	F63	10 m (32.8 ft) standard		L55
pSignal, pSignal, R	F64	10 m (32.8 ft), standar		L56
pSignal, Ip, None	F65	25 m (82 ft), standard 25 m (82 ft), standard	with M12 plugs fitted	L59 L60
pSignal, Ip, Ip	F66 F67	, ,,	Nuith M12 slugg fitted	L63
pSignal, Ip, R pSignal, R, None	F70	50 m (164 ft), standard		L64
pSignal, R, R	F71	75 m (246 ft), standard	L67	
aSignal, aSignal, pSignal	F80	75 m (246 ft), standard	L68	
aSignal, aSignal, Ip	F81	150 m (492 ft), standa	L71	
aSignal, pSignal, None	F82	150 m (492 ft), standa	L72	
aSignal, pSignal, pSignal	F83	Additional data		
aSignal, pSignal, la aSignal, pSignal, lp	F84 F85	Please add "-Z" to Article No. and specify Order		
aSignal, pSignal, R	F86	code(s) and plain text.		
aSignal, Ia, Ip	F87	Tag name		
aSignal, Ip, None	F90	Tag name plate, stainle	ess steel	Y17
aSignal, Ip, Ip	F91		r delivery times for configurations on the second results of the second results are related to the second results are second results are related to the second results are results are related to the second related to the second results are relat	
aSignal, Ip, R pSignal, pSignal, Ia	F92 F93			по аррепаіх.
pSignal, Ia, None	F94	· · ·	ions for SITRANS FC430	
pSignal, Ia, Ia	F95	Description	Article No.	
pSignal, la, lp	F96	• English	A5E03361511	
pSignal, Ia, R	F97	German	A5E03651143	
Notes on I/O configurations: a or p suffix: The I/O module is selected at ordering		• Spanish	A5E03651152	
with either active or passive function.		• French	A5E03651188	
<b>Signal:</b> The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.		<ul><li>Italian</li><li>Chinese</li></ul>	A5E03651190 A5E03922773	
I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.		This device is shipped further SITRANS F C li	I with a Quick Start guide and a CE terature.	containing
R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.		All literature is also available for free at: http://www.siemens.com/flowdocumentation		
The MLFB structure for FC430 systems must be filled to <b>this level</b> , including <b>"-Z"</b> options A, B, E and F				

# SITRANS F C

# Flowmeter SITRANS FC430

Selection and Ordering data		Article No. Ord. code
SITRANS FC430 Digital coriolis flowmeter		7 M E 4 6 2 3 -
with SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 μm, 3A approved, and compact or remote mount- ing with FCT030 transmitter		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
DN 15, DN 20 (½", ¾") DN 15, DN 25 (½", 1") DN 25, DN 25 (1", 1") DN 25, DN 32 (1", 1¼") DN 25, DN 40 (1", 1½")	••••	3 F 3 G 3 H 3 J 3 L 3 M 3 N 4 B
DN 50, DN 50 (2", 2") DN 80, DN 65 (3", 2½")	• • •	4 C 4 J 4 K
Process connection	_	41
	•	F1
	•	G 1
DIN 11864-1 0.8 µm hygienic screwed DIN 11864-2A BF-A 0.8 µm hygienic screwed (metric)	•	H 1 H 2
DIN 11864-3A BF-A 0.8 µm hygienic clamped DIN 11864-2B BF-A 0.8 µm hygienic flanged (NPS)	•	H 3 H 4
	•	J 1 J 5
Wetted parts material		
AISI 316L/1.4435 (40 bar max.)	•	1
Calibration/Accuracy class 0.1 % flow, 5 kg/m³ density 0.1 % flow, 1 kg/m³ density Standard fraction calibration	•	1 4 8
Transmitter/DSL material and mounting style		
Compact, IP67, aluminum Remote, IP67, aluminum, M12	• • •	D G K
ATEX II 2GD IECEx GDb	• • • •	A C F H M
	•	1 3

We can offer shorter delivery times for configurations designated with
the Quick Ship Symbol . For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
- Colonian and Ordering data	Oraci coac
Further designs	
Please add "- $\mathbf{Z}$ " to Article No. and specify Order code(s).	
Cable glands	
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Sofware functions and CT approvals	
Standard	B11
CT standard	B31
I/O configuration Ch1	
Ca 4 20 mA HART active SIL certified	E04
Cp 4 20 mA HART passive SIL certified	E05
Ca 4 20 mA HART active	E06
Cp 4 20 mA HART passive	E07

Only compact versions can be used in SIL applications.

# Flowmeter SITRANS FC430

Selection and Ordering data	Order code	Selection and Orderi	ing data	Order code		
I/O configuration Ch2, Ch3 and Ch4		Add-on options ar	nd accessories			
None aSignal, None, None	F00 F40	Please add "-Z" to Art code(s).				
aSignal, aSignal, None	F41	Certificates				
aSignal, aSignal	F42	Pressure test certificat	C01			
aSignal, aSignal, la	F43	Pressure test certificat		C02		
aSignal, aSignal, R	F44	Material certificate EN	I 10204-3.1	C05		
aSignal, Ia, None	F45	Welding inspection re	port	C07		
aSignal, Ia, Ia	F46	Factory certificate to E		● C10		
aSignal, la, R	F47	Factory certificate to E	EN 10204 2.2	C11		
aSignal, R, None	F50	Cable				
aSignal, R, R	F51	None		L50		
pSignal, None, None pSignal, pSignal, None	F60 F61	5 m (16.4 ft), standard	d with M12 plugs fitted	L51		
, , , , , , , , , , , , , , , , , , , ,	F62	5 m (16.4 ft), standard	d	L52		
pSignal, pSignal, pSignal pSignal, pSignal, lp	F63	10 m (32.8 ft) standar	d with M12 plugs fitted	L55		
pSignal, pSignal, R	F64	10 m (32.8 ft), standar	rd	L56		
pSignal, Ip, None	F65	25 m (82 ft), standard	with M12 plugs fitted	L59		
pSignal, lp, lp	F66	25 m (82 ft), standard		L60		
pSignal, Ip, R	F67	\ //	d with M12 plugs fitted	L63		
pSignal, R, None	F70	50 m (164 ft), standar	L64			
pSignal, R, R	F71	75 m (246 ft), standar	L67			
aSignal, aSignal, pSignal	F80	75 m (246 ft), standar	L68			
aSignal, aSignal, Ip	F81	150 m (492 ft), standa	L71			
aSignal, pSignal, None aSignal, pSignal, pSignal	F82 F83	150 m (492 ft), standa	L72			
aSignal, pSignal, la	F84	Additional data				
aSignal, pSignal, Ip	F85		ticle No. and specify Order			
aSignal, pSignal, R	F86	code(s) and plain text	i.			
aSignal, la, lp	F87	Tag name				
aSignal, Ip, None	F90	Tag name plate, stainl	less steel	Y17		
aSignal, Ip, Ip	F91		er delivery times for configurations			
aSignal, Ip, R	F92	the Quick Ship Syn	nbol •. For details see page 9/5 in	n the appendix.		
pSignal, pSignal, la	F93	Operating instruct	tions for SITRANS FC430			
pSignal, Ia, None	F94	Description	Article No.			
pSignal, la, la pSignal, la, lp	F95 F96	• English	A5E03361511			
pSignal, Ia, IP	F97	German	A5E03651143			
Notes on I/O configurations:		<ul> <li>Spanish</li> </ul>	A5E03651152			
a or p suffix: The I/O module is selected at ordering		• French	A5E03651188			
with either active or passive function. <b>Signal:</b> The output can be selected for Current (0 or 4		• Italian	A5E03651190			
to 20 mA), frequency or pulse function in the menu.		• Chinese <b>A5E03922773</b>				
I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.		This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.				
R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.		All literature is also av http://www.siemens.co	ailable for free at: om/flowdocumentation			
The MLFB structure for FC430 systems must be filled to <b>this level</b> , including <b>"-Z"</b> options A, B, E and F						

SITRANS F C

# Flowmeter SITRANS FC430

Flowilleter SITRAINS FC430									
Selection and Ordering data		Artio	cle	Ν	0.	C	)rd.	. cod	de
SITRANS FC430 Digital coriolis flowmeter		7 M I	E 4	7	1 3	-			
with SITRANS FCS400 NAMUR complient flow sensor with flange/pipe thread con- nections and compact or remote mount- ing with FCT030 transmitter		ľ	ľ	Ī				ľ	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Sensor size, Connection size									
DN 15, DN 6 (½", ¼") DN 15, DN 10 (½", 3/8")	•	3 E							
DN 15, DN 15 (½", ½")	•	3 G							
DN 15, DN 20 (½", ¾") DN 15, DN 25 (½", 1")	•	3 H							
DN 25, DN 25 (1", 1")	•	3 L							
DN 25, DN 32 (1", 11/4")	•	3 M							
DN 25, DN 40 (1", 1½")	•	3 N							
DN 50, DN 40 (2", 1½") DN 50, DN 50 (2", 2")	•	4 B							
DN 80, DN 65 (3", 2½")	•	4 J							
DN 80, DN 80 (3", 3")	•	4 K							
DN 80, DN 100 (3", 4")  Process connection	•	4 L							
EN 1092-1 B1, PN 16			Α 0						
EN 1092-1 B1, PN 40 EN 1092-1 B1, PN 63	•		A 1 A 2						
EN 1092-1 B1, PN 100	•		A 3						
EN 1092-1 B1, PN 160		ı	B 1						
EN 1092-1 D, PN 40 EN 1092-1 D, PN 63			A 5 A 6						
EN 1092-1 D, PN 100			A 7						
EN 1092-1 D, PN 160			A 8						
ANSI B16.5, RF, class 150 ANSI B16.5, RF, class 300			D 1 D 2						
ANSI B16.5, RF, class 600	•	ı	D 3						
ANSI B16.5, RF, class 900	•		D 4						
ISO228-1 G pipe thread ASME B1.20.1 NPT pipe thread	•		E 1 E 3						
DIN 11851 Hygienic screwed	•	ı	F 1						
DIN 32676-C (inch) Hygienic clamped	•	(	G 1						
DIN 11864-1 Hygienic screwed	•		H 1						
DIN 11864-2A BF-A Hygienic flanged metric DIN 11864-3A Hygienic clamped			H 2 H 3						
DIN 11864-2B BF-A Hygienic flanged NPS		ı	H 4						
ISO 2852 Hygienic clamped			J 1						
ISO 2853 Hygienic screwed SMS 1145 Hygienic screwed			J 5 K 1						
Swagelok Quick Connect			K 5						
JIS B2200/10K			L 2						
JIS B2200/20K JIS B2200/40K			L 4 L 6						
JIS B2200/63K			L 7						
Wetted parts material									
AISI 316L/W1.4435/W1.4404 (100 barg max.)	•			1					
Calibration/Accuracy class 0.1 % flow, 5 kg/m³ density					1				
0.1 % flow, 1 kg/m³ density	•				4				
Standard fraction calibration					8				
Transmitter/DSL material & mounting style									
Compact, IP67, aluminum	•					D			
Remote, IP67, aluminum, M12 Remote, IP67, aluminum, T/Box	•					G K			

Selection and Ordering data	Article No.	Ord. code				
SITRANS FC430 Digital coriolis flowmeter	7ME4713-					
with SITRANS FCS400 NAMUR complient flow sensor with flange/pipe thread con- nections and compact or remote mount- ing with FCT030 transmitter						
Ex approval						
Non-Ex   ◆		Α				
ATEX II 2GD ●		С				
IECEx GDb   ◆		F				
FM, Class 1, Div 1		н				
CSA, Class 1, Zone 1		M				
Local User Interface						
Blind		1				
Graphical, 240 x 160 pxl		3				
- 14/						

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Sofware functions and CT approvals	
	B11
CT standard	B31
I/O configuration Ch1	
Ca 4 20 mA HART active, SIL certified	E04
Cp 4 20 mA HART passive, SIL certified	E05
Ca 4 20 mA HART active	E06
Cp 4 20 mA HART passive	E07

Only compact versions can be used in SIL applications.

# Flowmeter SITRANS FC430

Selection and Ordering data	Order code	Selection and Orderin	ng data	Order code		
I/O configuration Ch2, Ch3 and Ch4	2.22.0000	Add-on options and	<u> </u>			
None	F00	•	cle No. and specify Order			
aSignal, None, None	F40	code(s).	olo 140. and opoonly Ordor			
aSignal, aSignal, None	F41	Certificates				
aSignal, aSignal, aSignal	F42	Pressure test certificate	e CRN	C01		
aSignal, aSignal, la	F43	Pressure test certificate		C02		
aSignal, aSignal, R aSignal, Ia, None	F44 F45	Material certificate EN	10204-3.1	C05		
aSignal, Ia, Ia	F46	Welding inspection rep		C07		
aSignal, Ia, Ia aSignal, Ia, R	F47	Factory certificate to El Factory certificate to El		• C10 C11		
aSignal, R, None	F50	Cable	10204 2.2	011		
aSignal, R, R	F51			1.50		
pSignal, None, None	F60	None	with MACO of horse fitters.	L50 L51		
pSignal, pSignal, None	F61	5 m (16.4 ft), standard 5 m (16.4 ft), standard	with M 12 plugs fitted	L52		
pSignal, pSignal	F62	10 m (32.8 ft) standard	with M12 pluge fitted	L55		
pSignal, pSignal, Ip pSignal, pSignal, R	F63 F64	10 m (32.8 ft), standard		L56		
pSignal, Ip, None	F65	25 m (82 ft), standard v		L59		
pSignal, Ip, None	F66	25 m (82 ft), standard	. 3	L60		
pSignal, Ip, R	F67	50 m (164 ft), standard	with M12 plugs fitted	L63		
pSignal, R, None	F70	50 m (164 ft), standard		L64		
pSignal, R, R	F71	75 m (246 ft), standard	with M12 plugs fitted	L67		
aSignal, aSignal, pSignal	F80	75 m (246 ft), standard		L68		
aSignal, aSignal, Ip	F81	150 m (492 ft), standar	. 0	L71		
aSignal, pSignal, None aSignal, pSignal, pSignal	F82 F83	150 m (492 ft), standar	<u>a</u>	L72		
aSignal, pSignal, la	F84	Additional data				
aSignal, pSignal, Ip	F85	Please add "-Z" to Artic	cle No. and specify Order			
aSignal, pSignal, R	F86	code(s) and plain text.				
aSignal, Ia, Ip	F87	Tag name				
aSignal, Ip, None	F90	Tag name plate, stainle	ess steel	Y17		
aSignal, lp, lp	F91		delivery times for configurations			
aSignal, Ip, R pSignal, pSignal, Ia	F92 F93		bol . For details see page 9/5 in	ппе аррепиіх.		
pSignal, Ia, None	F93	· · · · · · · · · · · · · · · · · · ·	ons for SITRANS FC430			
pSignal, Ia, Ia	F95	Description	Article No.			
pSignal, la, lp	F96	<ul><li>English</li></ul>	A5E03361511			
pSignal, Ia, R	F97	<ul><li>German</li></ul>	A5E03651143			
Notes on I/O configurations:		<ul><li>Spanish</li></ul>	A5E03651152			
<b>a or p suffix:</b> The I/O module is selected at ordering with either active or passive function.		• French	A5E03651188			
Signal: The output can be selected for Current (0 or 4		• Italian	A5E03651190			
to 20 mA), frequency or pulse function in the menu.		<ul><li>Chinese</li></ul>	A5E03922773			
<b>I:</b> Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.		This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.				
R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.		All literature is also ava http://www.siemens.com				
selected in the menu, including 'Error', 'High flow warn-						

The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A..., B..., E... and F...

SITRANS F.C.

### Flowmeter SITRANS FC410

### Overview



The compact flowmeter SITRANS FC410 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- · High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

 $\ensuremath{\mathsf{FC410}}$  is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates.

The SITRANS FC410 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT010 transmitter always compact mounted.

#### Benefits

- It is narrow and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up.

Technical specifications	
Sizes	DN 15 (½"), DN 25 (1"), DN 50 (2"), DN 80 (3")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	DN 15: 3 700 kg/h (8 157 lb/h) DN 25: 11 500 kg/h (25 353 lb/h) DN 50: 52 000 kg/h (114 640 lb/h) DN 80: 136 000 kg/h (300 000 lb/h)
Power supply	24 V DC ± 20 %; 110 mA
Weight	4.6 50 kg
Material	
<ul><li>Sensor</li><li>Measuring tubes</li></ul>	316L stainless steel or Hastelloy C22
- Enclosure	304 stainless steel
Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
<ul> <li>Measuring tubes</li> </ul>	
- 316L	100 bar (1450 psi)
- Hastelloy C22	160 bar (2321 psi)
Sensor enclosure	20 bar (DN15, DN 25) 17 bar (DN 50, DN 80)
Sensor enclosure burst pressure	>160 bar (all sizes)
Temperature ratings	
Process medium	-50 +200 °C (-58 +392 °F)
Ambient	-40 +60 °C (-40 +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP), VCO Quick-connect
Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
Hygienic clamps	DIN 11864-3A, DIN 32676, ISO 2852
Approvals	
Hazardous area	ATEX, IECEx, FM, NEPSI, CSA, INMETRO (installed with flame-proof conduit)
Pressure equipment	PED, CRN
Hygienic	3A, EHEDG
Marine	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
Communication	Modbus RTU
EMC performance	EN 61326-3-2
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all direc- tions. Flow accuracy cannot be

guaranteed under all conditions.

# Flowmeter SITRANS FC410

Selection and Ordering data		Arti	റില	N	0		rd	COC	70
I		7 M					ıu.	000	16
SITRANS FC410 Digital coriolis flowmeter with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter		7 M					1		
Click on the Article No. for the online con figuration in the PIA Life Cycle Portal.	-								
Sensor size, connection size									
DN 15, DN 10 (½", 3/8") DN 15, DN 15 (½", ½")		3 F 3 G							
DN 15, DN 20 (½", ¾")	•	3 H							
DN 15, DN 25 (½", 1")		3 J							
DN 25, DN 15 (1", ½") DN 25, DN 25 (1", 1") DN 25, DN 40 (1", 1½")	•	3 K 3 L 3 N							
DN 50, DN 40 (2", 1½")	•	4 B							
DN 50, DN 50 (2", 2") DN 80, DN 65 (3", 2½")	•	4 C 4 J							
DN 80, DN 80 (3", 3")	•	4 K							
DN 80, DN 100 (3", 4")		4 L							
Process connection			A 0						
EN 1092-1 B1, PN 16 EN 1092-1 B1, PN 40	•		A 1						
EN 1092-1 B1, PN 63			A 2						
EN 1092-1 B1, PN 100 EN 1092-1 B1, PN 160			A 3 B 1						
EN 1092-1 D NUT, PN 40			A 5						
EN 1092-1 D NUT, PN 63			A 6						
EN 1092-1 D NUT, PN 100 EN 1092-1 D NUT, PN 160			A 7 A 8						
ANSI B16.5-2009, class 150	•		D 1						
ANSI B16.5-2009, class 300			D 2						
ANSI B16.5-2009, class 600 ANSI B16.5-2009, class 900			D 3 D 4						
ISO228-1 G pipe thread ASME B1.20.1 NPT pipe thread	•		E 1 E 3						
DIN 11851 hygienic screwed			F 1						
DIN 32676 hygienic Tri-Clamp			G 1						
DIN 11864-1A asceptic screwed	•		H 1 H 2						
DIN 11864-2A asceptic flanged DIN 11864-3A clamped			п 2 Н 3						
ISO 2852 hygienic clamped	•		J 1						
ISO 2853 hygienic screwed			J 5						
SMS 1145 hygienic screwed 12-VCO-4 quick connect			K 1 K 5						
JIS B2200:2004/10K			L 2						
JIS B2220:2004/20K			L 4						
JIS B2220:2004/40K JIS B2220:2004/63K			L 6 L 7						
Wetted parts material									
AISI 316L/W1.4435/W1.4404 (100 barg max.) Hastelloy C22 (only for 7ME461)	•			1 3					
Calibration/Accuracy class									
0.1 % flow, 5 kg/m³ density 0.1 % flow, 1 kg/m³ density	•				1				
Standard fraction calibration	_				8				
Ex approval									
Non-Ex ATEX II 2GD	•					A			
IECEx GDb	•					F			
FM, Class 1, Div 1	•					Н			
CSA, Class 1, Zone 1						M			

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable glands Metric, no glands Metric, plastic	A01 A02
Metric, brass/Ni plated Metric, stainless steel NPT, no glands	A05 A06 A11
NPT, Plastic NPT, brass/Ni plated NPT, stainless steel	A12 A15 A16
Integral M12 socket	A20
Sofware functions and CT approvals Standard	B11
I/O configuration Ch1 Modbus RTU RS 485	E14
I/O configuration Ch2, Ch3 and Ch4  None The Article No. for FC410 systems must be filled to this level, including "-Z" options A, B, E and F	F00

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# SITRANS F C

### Flowmeter SITRANS FC410

Selection and Ordering data	Order code
Add-on options and accessories  Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN Pressure test certificate PED Material certificate EN 10204-3.1	C01 C02 C05
Welding inspection report Factory certificate to EN 10204 2.1 Factory certificate to EN 10204 2.2  ■	C07 C10 C11
Cable <sup>1)</sup>	
None	L50
5 m (16.4 ft), standard with M12 plugs fitted 5 m (16.4 ft), standard	L51 L52
10 m (32.8 ft) standard with M12 plugs fitted 10 m (32.8 ft), standard	L55 L56
25 m (82 ft), standard with M12 plugs fitted 25 m (82 ft), standard	L59 L60
50 m (164 ft), standard with M12 plugs fitted 50 m (164 ft), standard	L63 L64
75 m (246 ft), standard with M12 plugs fitted 75 m (246 ft), standard	L67 L68
150 m (492 ft), standard with M12 plugs fitted 150 m (492 ft), standard	L71 L72
Additional data  Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

<sup>1)</sup> M12 versions of cable have a plug at both ends.

### Operating instructions for SITRANS FC410

Description	Article No.	
• English	A5E33120874	
<ul><li>German</li></ul>	A5E33124885	
<ul><li>Spanish</li></ul>	A5E33209358	
• French	A5E33209377	
• Italian	A5E33209408	
• Chinese	A5E33209431	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Flowmeter SITRANS FC410

Selection and Ordering data		Article	e No	Э.	Ord	l. code	е
SITRANS FC410 Digital coriolis flowmeter	7ME4621-						
with SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 µm, 3A approved, and compact mounting with FCT010 transmitter					1	T	
Sensor size, connection size							
DN 15, DN 10 (½", 3/8")		3 F					
	•	3 G 3 H					
	-	3 J					
		3 L					
DN 25, DN 32 (1", 11/4")		3 M					
DN 25, DN 40 (1", 1½")	٠	3 N					
DN 50, DN 40 (2", 1½")	٠	4 B					
DN 50, DN 50 (2", 2")	•	4 C					
DIV 00, DIV 00 (0, 2/2)	•	4 J					
Bit 66, Bit 66 (6 , 6 )	٠	4 K					
Process connection							
DIN 11851 0.8 µm hygienic screwed	•	F 1					
DIN 32676 0.8 µm hygienic Tri-Clamp	•	<b>G</b> 1					
ziit i ioo i i olo piii iygiciiio colottoa	•	H 1					
DIN 11864-2A BF-A 0.8 µm hygienic flanged (metric)		H 2	2				
· ·	•	нз	3				
clamped							
DIN 11864-2B BF-A0.8 μm hygienic flanged (NPS)		H 4					
ISO 2852 0.8 µm hygienic clamped	•	J 1					
ISO 2853 0.8 µm hygienic screwed	•	J 5	5				
Wetted parts material							
AISI 316L/1.4435 (40 bar max.)	•		1				
Calibration/Accuracy class							
o. 1 70 now, o regim donoity	•			1			
0.1 % flow, 1 kg/m³ density Standard fraction calibration				4 8			
Ex approval	_			J			
	•				Α		
ATEX II 2GD	•				C		
IEOEK GDB	•				F		
1101, 01000 1, 010 1	•				Н		
CSA, Class 1, Zone 1					М		

<ul> <li>We can offer shorter delivery ti</li> </ul>	mes for configurations designated with
the Quick Ship Symbol . For	details see page 9/5 in the appendix.

Further designs Please add "-Z" to Article No. and specify Order code(s).  Cable glands Metric, no glands Metric, plastic Metric, brass/Ni plated Metric, stainless steel NPT, no glands NPT, plastic NPT, plastic NPT, brass/Ni plated NPT, stainless steel Sofware functions and CT approvals Standard  B1	
Please add "-Z" to Article No. and specify Order code(s).  Cable glands Metric, no glands Metric, plastic Metric, brass/Ni plated Metric, stainless steel NPT, no glands NPT, plastic NPT, plastic NPT, stainless steel Sofware functions and CT approvals Standard  B1  I/O configuration Ch1 Modbus RTU RS 485	Order code
Metric, no glands Metric, plastic Metric, brass/Ni plated Metric, stainless steel NPT, no glands NPT, plastic NPT, plastic NPT, brass/Ni plated NPT, stainless steel Integral M12 socket  Sofware functions and CT approvals Standard  I/O configuration Ch1 Modbus RTU RS 485  A AC  AAC  AAC  AC  B1  Metric, no glands AAC  AAC  AAC  AAC  B1  B1  B1  B1  B1  B1  B1  B1  B1  B	
Standard B1  I/O configuration Ch1  Modbus RTU RS 485  E1	A01 A02 A05 A06 A11 A12 A15 A16 A20
	311 E14
None The Article No. for FC410 systems must be filled to <b>this level</b> , including <b>"-Z"</b> options A, B, E and F	<del>-</del> 00

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# SITRANS F C

### Flowmeter SITRANS FC410

Selection and Ordering data	Order code
Add-on options and accessories  Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN Pressure test certificate PED Material certificate EN 10204-3.1	C01 C02 C05
Welding inspection report Factory certificate to EN 10204 2.1 Factory certificate to EN 10204 2.2	C07 C10 C11
Cable <sup>1)</sup>	
None	L50
5 m (16.4 ft), standard with M12 plugs fitted 5 m (16.4 ft), standard	L51 L52
10 m (32.8 ft) standard with M12 plugs fitted 10 m (32.8 ft), standard	L55 L56
25 m (82 ft), standard with M12 plugs fitted 25 m (82 ft), standard	L59 L60
50 m (164 ft), standard with M12 plugs fitted 50 m (164 ft), standard	L63 L64
75 m (246 ft), standard with M12 plugs fitted 75 m (246 ft), standard	L67 L68
150 m (492 ft), standard with M12 plugs fitted 150 m (492 ft), standard	L71 L72
Additional data  Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

<sup>1)</sup> M12 versions of cable have a plug at both ends.

### Operating instructions for SITRANS FC410

Description	Article No.	
• English	A5E33120874	
• German	A5E33124885	
<ul><li>Spanish</li></ul>	A5E33209358	
• French	A5E33209377	
• Italian	A5E33209408	
• Chinese	A5E33209431	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

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 For details see page 9/5 in the appendix.

# Flowmeter SITRANS FC410

Selection and Ordering data		Δrt	icl	٩	ΝI	)	Oro	l. co	nde
SITRANS FC410 Digital coriolis flowmeter		7 N					OIU	i. U	Jue
with SITRANS FCS400 NAMUR complient flow sensor with flange/pipe thread con- nections and compact mounting with FCT010 transmitter							1	i	-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Sensor size, Connection size									
DN 15, DN 6 (½", ¼") DN 15, DN 10 (½", 3/8")	•	3 E							
DN 15, DN 15 (½", ½")	•	3 0							
DN 15, DN 20 (½", ¾")	•	3 F							
DN 15, DN 25 (½", 1") DN 25, DN 25 (1", 1")	•	3 J							
DN 25, DN 25 (1", 1") DN 25, DN 32 (1", 11/4")	•	3 N							
DN 25, DN 40 (1", 1½")	•	3 N	ı						
DN 50, DN 40 (2", 1½") DN 50, DN 50 (2", 2")	•	4 E 4 C							
DN 80, DN 65 (3", 2½")	•	4 J	ı						
DN 80, DN 80 (3", 3") DN 80, DN 100 (3", 4")	•	4 K							
Process connection	_	7.							
EN1092-1 B1, PN 16			Α						
EN1092-1 B1, PN 40	•		A						
EN1092-1 B1, PN 63 EN1092-1 B1, PN 100	•		A						
EN1092-1 B1, PN 160			В	1					
EN1092-1 D, PN 40			A						
EN1092-1 D, PN 63 EN1092-1 D, PN 100			A						
EN1092-1 D, PN 160			Α						
ANSI B16.5, RF, class 150	•		D						
ANSI B16.5, RF, class 300 ANSI B16.5, RF, class 600	•		D D						
ANSI B16.5, RF, class 900	•		D	4					
ISO228-1 G pipe thread	•		E						
ASME B1.20.1 NPT pipe thread DIN 11851 Hygienic screwed	•		E	- 1					
DIN 32676-C (inch) Hygienic clamped	•		G						
DIN 11864-1 Hygienic screwed	•		Н						
DIN 11864-2A BF-A Hygienic flanged metric			Н						
DIN 11864-3A Hygienic clamped DIN 11864-2B BF-A Hygienic flanged NPS			Н						
ISO 2852 Hygienic clamped			J	1					
ISO 2853 Hygienic screwed			J	5					
SMS 1145 Hygienic screwed	•		K						
Swagelok Quick Connect  JIS B2200/10K	_		L						
JIS B2200/20K			Ĺ						
JIS B2200/40K			L						
JIS B2200/63K  Wetted parts material			L	-					
AISI 316L/W1.4435/W1.4404 (100 barg max.)	•				1				
Calibration/Accuracy class	_								
0.1 % flow, 5 kg/m³ density 0.1 % flow, 1 kg/m³ density	•					1 4			
Standard fraction calibration						8			
Ex approval									
Non-Ex ATEX II 2GD	•						A C		
IECEx GDb	•						F		
FM, Class 1, Div 1	•						H M		
CSA, Class 1, Zone 1							M		

Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands		A01
Metric, plastic		A02
Metric, brass/Ni plated		A05
Metric, stainless steel		A06
NPT, no glands		A11
NPT, plastic		A12
NPT, brass/Ni plated		A15
NPT, stainless steel		A16
Sofware functions and CT approvals		
Standard		B11
I/O configuration Ch1		
Modbus RTU RS 485		E14
I/O configuration Ch2, Ch3 and Ch4		
None	•	F00
The Article No. structure for FC410 systems must be filled to <b>this level</b> , including "-Z" options A, B, E and F		

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# SITRANS F C

### Flowmeter SITRANS FC410

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN Pressure test certificate PED Material certificate EN 10204-3.1	C01 C02 C05
Welding inspection report Factory certificate to EN 10204 2.1 Factory certificate to EN 10204 2.2	C07 C10 C11
Cable <sup>1)</sup>	
None	L50
5 m (16.4 ft), standard with M12 plugs fitted 5 m (16.4 ft), standard	L51 L52
10 m (32.8 ft) standard with M12 plugs fitted 10 m (32.8 ft), standard	L55 L56
25 m (82 ft), standard with M12 plugs fitted 25 m (82 ft), standard	L59 L60
50 m (164 ft), standard with M12 plugs fitted 50 m (164 ft), standard	L63 L64
75 m (246 ft), standard with M12 plugs fitted 75 m (246 ft), standard	L67 L68
150 m (492 ft), standard with M12 plugs fitted 150 m (492 ft), standard	L71 L72
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

<sup>1)</sup> M12 versions of cable have a plug at both ends.

### Operating instructions for SITRANS FC410

Description	Article No.	
• English	A5E33120874	
<ul><li>German</li></ul>	A5E33124885	
<ul><li>Spanish</li></ul>	A5E33209358	
• French	A5E33209377	
• Italian	A5E33209408	
• Chinese	A5E33209431	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Flow sensor SITRANS FCS400

### Overview



The flow measuring principle is based on the Coriolis Effect. The FCS400 sensor's measuring tubes are energized by an electromechanical driver circuit which oscillates them at their resonance frequency.

Two pick-ups are placed symmetrically upstream and downstream of the central driver. When a process fluid passes through the sensor, the Coriolis Effect will act on the vibrating tubes and cause deflection which can be measured as a phase shift between pick-ups 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from both of the pickups.

The temperatures of the sensor tubes and frame are measured with high precision to provide compensation for changes with temperature in the measuring properties.

The sensor signals are analyzed for flow, density and fluid temperature in the sensor front end. The digital signal is controlled to conform to high Safety Integrated Level (SIL) and sent digitally to the transmitter via standard cable. The FCT030 further calculates total mass and volume, fraction, dosing control and many other functions.

The front-end module has a process noise filter, which can be used to improve the meter's performance when installation and application conditions are not ideal. Typical interferences from process conditions such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

### Integration

The SITRANS FCS400 Massflow sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be supplied with hazardous certification to Class 1 Zone 1 (ATEX, IECEx) or Class 1 Div. 1 (FM).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site <a href="https://www.siemens.com/fc430/sizer">www.siemens.com/fc430/sizer</a>

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

#### Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

#### Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

#### Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

#### System design

- The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow. The meter is protected in a pressure-rated stainless steel enclosure with two purge ports to support a pressure guard in non-Ex applications.
- The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.
- Vibration mode separation creates a controlled measuring environment only within the CompactCurve part of the tubes. As a result the sensor has high immunity to plant vibration while avoiding large mass balancing of the meter components.
- The 15° slope of the CompactCurve shape ensures secure self-draining when the sensor axis is mounted vertically or up to 10° off vertical.
- The sensor frame is designed to conduct plant vibrations directly through the sensor body to adjacent pipeline while providing isolation of the metering section from the vibration. Careful mounting of the pipeline with regard to minimizing vibration at the meter will ensure a secure measurement environment

# Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter <u>upstream</u> of any control valve (what goes in, comes out) or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement.
   Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.

### SITRANS F C

### Flow sensor SITRANS FCS400

- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

#### Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

The maximum design length for the sensor cable is 200 m (656 ft), limited to 150 m (492 ft) for Ex applications with Class IIC gases. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	$[\Omega]$	100 @ 1 MHz
Insulation resistance	$[M\Omega/km]$	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

- High performance plugged cable using M12 plugs into prepared sockets
- Cable glands for either metric or NPT threaded terminal housings.
- Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

### Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS400 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Where trace heating is employed, an electric heating jacket can be ordered as an accessory. It is shaped to the sensor body and controlled from a weatherproof setpoint device.

The jacket can heat the sensor enclosure up to 200 °C (392 °F). However further insulation is also recommended for personnel protection or low loss temperature maintenance.

### Calibration

To ensure accurate measurement all flowmeters must be initially calibrated. The calibration of each SITRANS FCS400 coriolis sensor is conducted at SIEMENS flow facilities accredited according to ISO/IEC 17025 by DANAK. A calibration certificate is shipped with every sensor and calibration data are stored in the SensorFlash memory unit. The accreditation body DANAK has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

# Flow sensor SITRANS FCS400

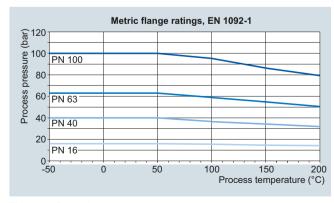
# Technical specifications

Flow sensor FCS400		
Parameter	Unit	Value
Process pressure range	[barg (psi)]	316L: 0 100 (0 1450) Hastelloy C22: 0 160 (0 2321)
Process temperature range	[°C (°F)]	-50 +200 (-58 +392)
Ambient temperature range	[°C (°F)]	-40 +60 (-40 +140)
Transport temperature range	[°C (°F)]	-40 +70 (-40 +158)
Density range	[kg/m <sup>3</sup> (lb/ft <sup>3</sup> )]	1 5000 (0.062 312.2)
Process media	Fluid group	1 (suitable for dangerous fluids)
	Form	Light slurry, liquid and non-condensing gas
No. of process values		
<ul> <li>Primary process values</li> </ul>		• Mass flow
		• Density
		Process medium temperature
<ul> <li>Derieved process values</li> </ul>		Volume flow
		• Corrected volume flow (with reference density)
		• Fraction A:B
		• Fraction % A:B

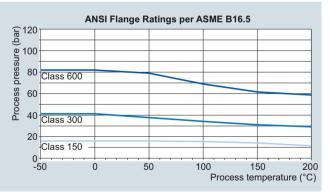
Performance specifications			Sc	ensor	
Parameter	Unit	DN 15	DN 25	DN 50	DN 80
Max. zero point error	[kg/h (lb/min)]	0.2 (0.007)	2.0 (0.072)	7.5 (0.276)	18 (0.66)
Qmin	[kg/h (lb/min)]	20 (0.735)	200 (7.35)	750 (27.6)	900 (33.1)
Qnom	[kg/h (lb/min)]	3 700 (136.0)	11 500 (422.6)	52 000 (1 911)	136 000 (4 997)
Qmax	[kg/h (lb/min)]	6 400 (14 110)	17 700 (39 022)	70 700 (155 867)	181 000 (399 036)
Linearity error	[%]	± 0.1	± 0.1	± 0.1	± 0.1
Repeatability	[%]	± 0.05	± 0.05	± 0.05	± 0.05
Density error	$[kg/m^3 (lb/ft^3)]$	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)
Extended density calibration	$[kg/m^3 (lb/ft^3)]$	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)
Temperature error	[°C (°F)]	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)

# Pressure/temperature curves

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS400 product program.



EN1092-1 flanged sensors



ASME B16.5 flanged sensors

SITRANS F C

# Flow sensor SITRANS FCS400

### Sensor variants

SITRANS FCS400 sensors are available in three main variants: Standard, hygienic and NAMUR. A wide range of process connections is available for the FCS400 sensors. The available combinations of type, sensor size and connection size are shown in the tables below.

### Standard sensors

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 D Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1A Aseptic secrewed	DIN 11864-2A Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed	SMS 1145 Hygineic screwed	12-VCO-4 Quick connect	JIS B2200:2004/10K	JIS B2200:2004/20K	JIS B2200:2004/40K
							316	Stai	nless	- Sta	andar	d: 7N	IE461	l										
DN 15 (½")	DN 6 (1/4")											0	0											
	DN 10 ( <sup>3</sup> / <sub>8</sub> ")													0										
	DN 15 (½")	•	•	0	•	0	0	0	•	•	•	•	•	•	•	•	•				0	0	0	0
	DN 20 (¾")		•						•	0	•				•									
	DN 25 (1")	•	•		•									0				•	•	0				
DN 25 (1")	DN 15 (½")																							
	DN 25 (1")	•	•	0	•	0	0	0	•	0	•	•	•	•	•	•	•	•	•	0		0	0	0
	DN 32 (11/4")		•											0										
	DN 40 (1½")	0	•		0				0	0	0				•			0	0					
DN 50 (2")	DN 25 (1")																							
	DN 40 (1½")	0	•	0	•	0	0	0						0		•	•	0	0	0				
	DN 50 (2")	•	•	0	•	0	0	0	•	•	•	•	•	•	•	•	•	•	•	0		0	0	0
	DN 65 (2½")																							
DN 80 (3")	DN 50 (2")																							
	DN 65 (2½")	0	•	0	0				•	0	•			•										
	DN 80 (3")	•	•	0	•	0	0	0	•	•	•			•	•	•	•	•	•	0		0	0	0
	DN 100 (4")	•	0	0	0																			

- Combinations shown are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown o are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

# Flow sensor SITRANS FCS400

# Hygienic sensor variants

The hygienic sensors all have maximum internal surface roughness  $< 0.8 \, \mu m$  and are EHEDG and 3A approved. Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size. Maximum pressure in the hygienic program is PN 40

Sensor	Connection 316 SS -	DIN 11851 0.8 µm screwed	iii III 32676 0.8 µm Tri-clamp	西 95 DIN 11864-1 0.8 μm screwed	: DIN 11864-2 0.8 µm flanged	ISO 2852 0.8 µm clamped	ISO 2853 0.8 µm screwed
DN 15 (½")	DN 6 (1/4")						
	DN 10 (3/ <sub>8</sub> ")	0					
	DN 15 (½")	•	•	•	•		
	DN 20 (¾")		•				
	DN 25 (1")	0				•	•
DN 25 (1")	DN 15 (½")						
	DN 25 (1")	•	•	•	•	•	•
	DN 32 (11/4")	0					
	DN 40 (1½")		•			0	0
DN 50 (2")	DN 25 (1")						
	DN 40 (1½")	0		0	•	0	0
	DN 50 (2")	•	•	•	•	•	•
	DN 65 (2½")						
DN 80 (3")	DN 50 (2")						
	DN 65 (2½")	•					
	DN 80 (3")	•	•	•	•	•	•
	DN 100 (4")						

- Combinations shown are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown o are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

### Aseptic flanged process connections

The aseptic flanges offered for FCS400 conform with the standard DIN 11864-2A BF-A. The flange fitted to the sensor is therefore the back flange and the seal is an O-ring.

The flange dimensions in the FCS400 program are as follows:

Size DN	Pipe	Bore d <sub>1</sub>	Ring OD d <sub>11</sub>	Bolt Circle d <sub>5</sub>	Bolt holes	Flange diameter d <sub>10</sub>
10	13 x 1.5	10	22.4	37	4 x Ø9	54
15	19 x 1.5	16	28.4	42	4 x ∅9	59
20	23 x 1.5	20	32.4	47	4 x ∅9	64
25	29 x 1.5	26	38.4	53	4 x ∅9	70
32	35 x 1.5	32	47.7	59	4 x ∅9	76
40	41 x 1.5	38	53.7	65	4 x ∅9	82
50	53 x 1.5	50	65.7	77	4 x ∅9	94
65	70 x 2.0	66	81.7	95	8 x Ø9	107
80	85 x 2.0	81	97.7	112	8 x Ø11	113

DIN 11864-2A BF-A flange dimensions

SITRANS F.C.

# Flow sensor SITRANS FCS400

# NAMUR sensor variants

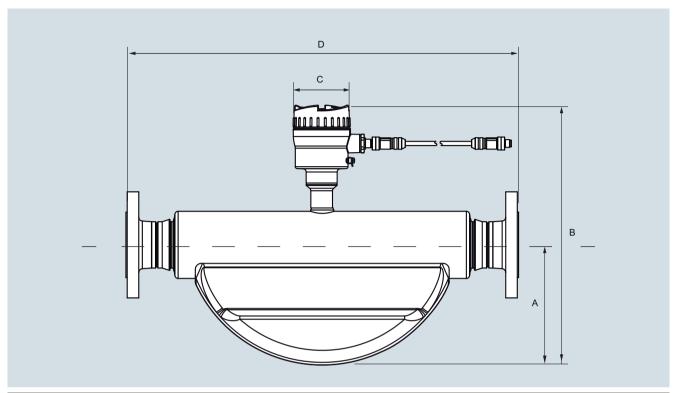
The NAMUR variants have build-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN1092-1 PN 40 with B1 flange facing. For couplings of other standards such as ASME B16.5 Class 150, the overall length incorporates the difference in length between standard EN and ASME flanges. NAMUR variants are offered with flange and pipe thread connections according to EN, ISO oand ASME standards, as shown in the table below

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 D Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1A Aseptic secrewed	DIN 11864-2A Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed
DNI 15 (1/ !!)	DNI 6 (1/4)					310	stainle	:55 - N	AWUK:	. / IVI <b>⊑</b> 4	7 1	0	0						
DN 15 (½")	DN 6 (1/4")											U	U	0					
	DN 10 (3/8")	_		_		_	_	_		_				•					
	DN 15 (½")	0	•	0	•	0	0	0	•	0	•	•	•	•	•	•	•		
	DN 20 (¾")	_							•	0	•			_	•				
D11.05 (48)	DN 25 (1")	0	•		•									0				•	•
DN 25 (1")	DN 15 (½")	_		_	_	_	_	_	_	_	_	_	_	_					_
	DN 25 (1")	0	•	0	•	0	0	0	•	0	•	•	•	•	•	•	•	•	•
	DN 32 (11/4")	_			_					_				0	_				_
	DN 40 (1½")	0	•		0				0	0	0				•			0	0
DN 50 (2")	DN 25 (1")	_		_	_	_	_	_						_		_	_		_
	DN 40 (1½")	0	•	0	•	0	0	0	_	_	_	_	_	0		0	•	0	0
	DN 50 (2")	0	•	0	•	0	0	0	•	0	•	•	•	•	•	•	•	•	•
	DN 65 (2½")	0																	
DN 80 (3")	DN 50 (2")																		
	DN 65 (2½")	0	•	0	0				•	0	•			•					
	DN 80 (3")	0	•	0	•	0	0	0	•	0	•			•	•	•	•	•	•
	DN 100 (4")	0	0	0	0														

- Combinations shown are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown o are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

Flow sensor SITRANS FCS400

# Dimensional drawings



Sensor		Α		В		С		Weight	
[DN]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15	1/2	90	3.54	280	11.0	90	3.54	4.6	10.1
25	1	123	4.84	315	12.4	90	3.54	7.9	17.4
50	2	187	7.36	390	15.4	90	3.54	25.7	56.7
80	3	294	11.6	504	19.8	90	3.54	66.5	147

SITRANS FCS400, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The build-in length D depends on the flange.

SITRANS F C

# Flow sensor SITRANS FCS400

# Overall length

The overall length (build-in length) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

316L stainless - Standard: 7ME461.-...

Sensor	DN 15	(½")				DN 25	(1")		DN 50	(2")	DN 80 (	(3")	
Connection	DN 6 (¼")	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")
EN 1092-1 B1, PN 16			265		265	360			610	610	915	840	840
EN 1092-1 B1, PN 40			265		265	360		365	610	610	915	840	840
EN 1092-1 B1, PN 63			265			360			610	610	915	915	915
EN 1092-1 B1, PN 100			270		275	360			610	610	915	915	915
ANSI B16.5, class 150			270	270		360		365		620	915	875	
ANSI B16.5, class 300			270	270		360		380		620	915	875	
ANSI B16.5, class 600			270	285		360		380		620	915	875	
ISO 228-1 GH pipe thread	265		265			365				620			
ANSI B1.20.1 NPT pipe thread	265		270			365				620			
DIN 11851 Hygienic screwed		265	265		193	360	360		610	610	840	840	
DIN 32676-C Hygienic clamp			265	265		360		360		610		875	
DIN 11864-1 Aseptic screwed			265	265		360				610		875	
DIN 11864-2 Aseptic flange			265	265		360		274	620	610		875	
ISO 2852 Hygienic clamp					265	360			610	610		840	
ISO 2853 Hygienic screwed			265			360		274		610		860	

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15	(½")				DN 25	(1")		DN 50	(2")	DN 80	(3")	
Connection	DN 6 (1/4")	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")
EN 1092-1 B1, PN 16			10.43		10.43	14.17			24.02	24.02	36.02	33.07	33.07
EN 1092-1 B1, PN 40			10.43		10.43	14.17		14.37	24.02	24.02	36.02	33.07	33.07
EN 1092-1 B1, PN 63			10.43			14.17			24.02	24.02	36.02	36.02	36.02
EN 1092-1 B1, PN 100			10.63		10.83	14.17			24.02	24.02	36.02	36.02	36.02
ANSI B16.5, class 150			10.63	10.63		14.17		14.37		24.41	36.02	34.45	
ANSI B16.5, class 300			10.63	10.63		14.17		14.96		24.41	36.02	34.45	
ANSI B16.5, class 600			10.63	11.22		14.17		14.96		24.41	36.02	34.45	
ISO 228-1 GH pipe thread	10.43		10.43			14.37				24.41			
ANSI B1.20.1 NPT pipe thread	10.43		10.63			14.37				24.41			
DIN 11851 Hygienic screwed		10.43	10.43		7.60	14.17	14.17		24.02	24.02	33.07	33.07	
DIN 32676-C Hygienic clamp			10.43	10.43		14.17		14.17		24.02		34.45	
DIN 11864-1 Aseptic screwed			10.43	10.43		14.17				24.02		34.45	
DIN 11864-2 Aseptic flange			10.43	10.43		14.17		10.78	24.41	24.02		34.45	
ISO 2852 Hygienic clamp					10.43	14.17			24.02	24.02		33.07	
ISO 2853 Hygienic screwed			10.43			14.17		10.78		24.02		33.86	

SITRANS FCS400, overall length, dimensions in inch

# Flow sensor SITRANS FCS400

316L stainless - Hygienic 0.8 μm: 7ME462.-...

Sensor	DN 15 (	1/2")			DN 25 (	1")		DN 50 (	2")	DN 80 (	3")
Connection	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")
DIN 11851 Hygienic screwed	265	265			360	360		610	610	840	840
DIN 32676-C Hygienic clamp		265	265		360		360		610		875
DIN 11864-1 Aseptic screwed		265			360				610		875
DIN 11864-2 Aseptic flange		265			360			620	610		875
ISO 2852 Hygienic clamp				265	360			610	610		840
ISO 2853 Hygienic screwed				265	360				610		860

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15 (1)	<b>′2")</b>			DN 25 (1	l <b>")</b>		DN 50 (2	2")	DN 80 (3	3")
Connection	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")
DIN 11851 Hygienic screwed	10.43	10.43		7.60	14.17	14.17		24.20	24.20	33.07	33.07
DIN 32676-C Hygienic clamp		10.43	10.43		14.17		14.17		24.20		34.45
DIN 11864-1 Aseptic screwed		10.43			14.17				24.20		34.45
DIN 11864-2 Aseptic flange		10.43			14.17			24.41	24.20		34.45
ISO 2852 Hygienic clamp				10.43	14.17			24.20	24.20		33.07
ISO 2853 Hygienic screwed				10.43	14.17				24.20		33.86

SITRANS FCS400, overall length, dimensions in inch

SITRANS F C

# Flow sensor SITRANS FCS400

316L stainless - NAMUR: 7ME471.-...

Sensor	DN 15	(½")				DN 25 (	(1")		DN 50	(2")	DN 80	(3")	
Connection	DN 6 (¼")	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")
EN 1092-1 B1, PN 16			510		510	600			715	715	915	915	915
EN 1092-1 B1, PN 40			510		510	600			715	715	915	915	915
EN 1092-1 B1, PN 63			510			600			715	715	915	915	915
EN 1092-1 B1, PN 100						600			715	715	915	915	915
EN 1092-1 D, PN 16			510			600			715	715		915	
EN 1092-1 D, PN 40			510			600			715	715		915	
EN 1092-1 D, PN 63						600			715	715		915	
ANSI B16.5, class 150						600					915		
ANSI B16.5, class 300						600					915		
ANSI B16.5, class 600						600					915		
ISO 228-1 GH pipe thread	510		510										
ANSI B1.20.1 NPT pipe thread	510												
DIN 11851 Hygienic screwed		510	510			600	600		715	715	915	915	
DIN 32676-C Hygienic clamp			510	510		600		600		715			
DIN 11864-1 Aseptic screwed			510			600				715			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					510	600			715	715		915	
ISO 2853 Hygienic screwed					510	600				715			

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15	(1/2")				DN 25	(1")		DN 50	(2")	DN 80	(3")	
Connection	DN 6 (1/4")	DN 10 (3/8")	DN 15 (½")	DN 20 (¾")	DN 25 (1")	DN 25 (1")	DN 32 (1¼")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")
EN 1091-1 B1, PN 16			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 40			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 63			20.08			23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 100						23.62			28.15	28.15	36.02	36.02	36.02
EN 1092-1 D, PN 16			20.08			23.62			28.15	28.15		36.02	
EN 1092-1 D, PN 40			20.08			23.62			28.15	28.15		36.02	
EN 1092-1 D, PN 63						23.62			28.15	28.15		36.02	
ANSI B16.5, class 150						23.62					36.02		
ANSI B16.5, class 300						23.62					36.02		
ANSI B16.5, class 600						23.62					36.02		
ISO 228-1 GH pipe thread	20.08		20.08										
ANSI B1.20.1 NPT pipe thread	20.08												
DIN 11851 Hygienic screwed		20.08	20.08			23.62	23.62		28.15	28.15	36.02	36.02	
DIN 32676-C Hygienic clamp			20.08	20.08		23.62		23.62		28.15			
DIN 11864-1 Aseptic screwed			20.08			23.62				28.15			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					20.08	23.62			28.15	28.15		36.02	
ISO 2853 Hygienic screwed					20.08	23.62				28.15			

SITRANS FCS400, overall length, dimensions in inch

### **Transmitter SITRANS FCT030**

### Overview



FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, corrected volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS400, sizes DN 15 to DN 80.

### Fraction

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- API number
- Balling
- Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé°
- Plato
- Specific Gravity

- °Twaddell
- %HFCS42
- %HFCS55
- %HFCS90
- Ethanol-Water 0 % to 20 %
- Ethanol-Water 15 % to 35 %
- Ethanol-Water 30 % to 55 %
- Ethanol-Water 50 % to 100 %

### Application

SITRANS FC430 mass flowmeters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, pharmaceuticals, blood products, vaccines, insulin production

- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO<sub>2</sub> dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

#### Benefits

#### Flow calculation and measurement

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time.
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- · Empty pipe monitoring

#### Operation and display

- User-configurable operation display
  - Full graphical display 240 x 160 pixels with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
  - Keypad can be used for controlling dosing as start/stop/ hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates
  - Pressure and material test certificates (as ordered)
  - Non-volatile memory backup of operational data
- Transfer of user configuration to other flowmeters

### Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations
- Designed from the ground up and certified for integrated safety in accordance with IEC 61508 and IEC 61511.
  - SIL 2 (single-channel operation)
  - SIL 3 (dual-channel operation)

Unlike many systems which are certified in practice, the SITRANS FC430 system is certified in design, which is a higher qualification and more robust for secure implementation of safety systems.

#### Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for massflow, volumeflow, corrected volumeflow, density, temperature or fraction flow such as °Brix or °Plato

SITRANS F.C.

### **Transmitter SITRANS FCT030**

Up to four I/O channels are configured as follows:

#### Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.2 which can be validated and setup for safety critical applications (SIL 2). The current signal can be configured for massflow, volumeflow or density.

#### Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Discrete one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

### Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

### Signal

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- · Discrete one or two-valve dosing control
- · Operational and alarm status

#### Relay

Relay output(s) can be user configured to:

- · Discrete one or two-valve dosing control
- Operation status including flow direction
- Alarm status

#### Signal input

Signal input can be user-configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Inititate automatic zero point adjustment

Signal outputs and inputs are individually ordered as active or passive.

During service and maintenance all outputs can be forced to a preset value for simulation, verification or calibration purposes.

### Approvals and certificates

The FC430 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

# Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with an FCS400 sensor of size DN 15, DN 25, DN 50 or DN 80.

FCT030 is available as standard with one current, HART 7.2 output and can be ordered with additional input/output functions.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

### SensorFlash

SensorFlash is a standard, 1 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent database of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the SIEMENS internet portal for Product Support and placed onto Sensor-Flash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded.

### Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count positive, negative or net flows
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for Custody Transfer requirements to OIML R 117
- Display of operating time with real-time clock. Daylight saving time is not implemented
- · Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow.
- Fraction flow computation is based on a 5th-order algorithm matching known applications. All standard fraction calculations fit within 0.1% of the true value.

# Transmitter SITRANS FCT030

Process media	Fluid Group 1 (suitable for	Ambien
	dangerous fluids)	Operation
	<ul> <li>Aggregate state: Paste/light slurry, liquid and gas</li> </ul>	• Transn
Number of process variables	7	• Displa
Measurement of	Mass flow	Storage
	Volume flow	Transn
	<ul><li>Density</li></ul>	
	<ul> <li>Process media temperature</li> </ul>	• Displa
	<ul> <li>Corrected volume flow</li> </ul>	Commu
	Reference density	Enclosu
	Fraction A flow	Material
	Fraction B flow	Rating
	• Fraction A %	Maahan
	• Fraction B %	Mechan
Current output		Supply
Current	0 20 mA or 4 20 mA (Channel 1 only 4 20 mA)	Supply
Load	$< 500 \Omega$ per channel	
Time constant	0 100 s adjustable	Fluctuati
Digital output <sup>1)</sup>	o 100 s aujustable	Power c
Pulse	41.6 µs 5 s pulse duration	EMC pe
Frequency	0 10 kHz, 50 % duty cycle,	Emission
requeriey	120 % overscale provision	Immunit
Time constant	0 100 s adjustable	NAMUR
Active	0 24 V DC, 110 mA, short-circuit-protected	
Passive	3 30 V DC, max. 110 mA	Environ
Relay		Environr
Туре	Change-over voltage-free relay contact	IEC/EN/
Load	30 V AC/100 mA	Mainten
Functions	Alarm level, alarm number, limit, flow direction	Cable g
Digital input		J
Voltage	15 30 V DC (2 15 mA)	
Functionality	Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output	
Galvanic isolation	All inputs and outputs are galva- nically isolated, isolation voltage 500 V.	Cable
Cut-off		
Low-flow	0 9.9 % of maximum flow	
Limit function	Mass flow, volume flow, fraction, density, sensor temperature	<sup>1)</sup> With 3
Totalizer	Three eight-digit counters for forward, net or reverse flow	option
Display	<ul> <li>Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults.</li> </ul>	
	Time constant as current output 1     Proverse flow indicated by	
Zero point adjustment	Reverse flow indicated by negative sign  Via keypad or remote via digital	
	input	

Ambient temperature			
Operation			
Transmitter	-40 +60 °C (-40 +140 °F), (humidity max. 95 %)		
• Display	-20 +60 °C (-4 +140 °F)		
Storage			
Transmitter	-40 +70 °C (-40 +158 °F) (Humidity max. 95 %)		
• Display	-20 +70 °C (-4 +158 °F)		
Communication	HART 7.2		
Enclosure			
Material	Aluminum		
Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH <sub>2</sub> O for 30 min.)		
Mechanical load	18 400 Hz random, 3.17 g RMS, in all directions		
Supply voltage			
Supply	20 27 V DC ± 10%; 100 240 V AC ± 10 %, 47 63 Hz		
Fluctuation	No limit		
Power consumption	7.5 W/15 VA		
EMC performance			
Emission	EN/IEC 61326-1-4 (Industry)		
Immunity	EN/IEC 61326-1-2 (Industry)		
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21		
Environment			
Environmental conditions acc. to	Altitude up to 2000 m		
IEC/EN/UL 61010-1	<ul> <li>Pollution degree 2</li> </ul>		
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.		
Cable glands	Cable gland are available in Nylon, Nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions:  • M20 • ½" NPT		
Cable	Standard industrial signal cable up to 200 m long with 2 x screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre cut lengths and prepared for either gland or plug connection.		

 $<sup>^{1)}</sup>$  With 300  $\Omega$  internal impedance. For coil switching use the passive output option.

# SITRANS F.C.

# **Transmitter SITRANS FCT030**

Approval	s
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Hazardous area

Custody transfer

- ATEX Ex II 2(1) GD Ex d e [ia] ia IIC T6 Gb
- FM/CSA Class1 Div. 1
- IECEx II 2(1) GD Ex d e [ia] ia IIC T6 Gb
- OIML R 117 type approval to a wide variety of liquids other than water
- PED
- CRN
- Hygienic applications

Pressure equipment

- EHEDG for hygienic variant sensors
- 3A for hygienic variant sensors
- External cleanability satisfies EHEDG and 3A rules

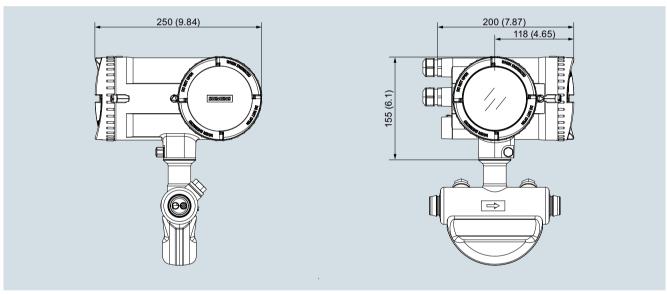
#### Certificates

Safety Integration Level (applies only to compact versions)

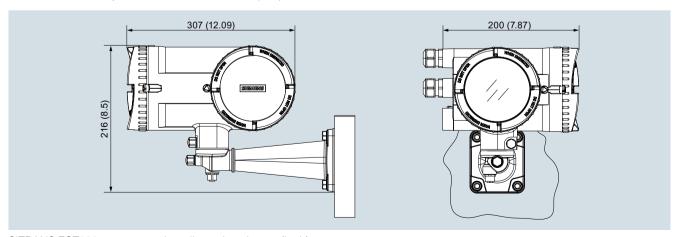
- CE mark
- Regional certifications

- SIL 3 for software
- SIL 2 for hardware
- SIL 3 for redundant hardware systems
- Pressure equipment
- Low voltage directive
- WEEE
- RoHS
- C-TICK (Australia and New Zealand EMC)
- NEPSI (China Ex)

### Dimensional drawings



SITRANS FCT030, compact version, dimensions in mm (inch)



SITRANS FCT030, remote version, dimensions in mm (inch)

# Flowmeter - Accessories/Spare parts

# Accessories

Description	Article No.	
CT plug	A5E31478498	4 4 ~
Tamper cover for CT locking. Fits over the M12 plug at both sensor and transmitter ends of the remote system cable	A3E31470430	
Bag of glands (metric) in black plastic 1)	A5E03907414	
Bag of glands, (metric) in gray plastic Ex e/i <sup>1)</sup>	A5E03907424	
Bag of glands (metric) in AISI 316 SS Ex e/i <sup>1)</sup>	A5E03907429	
Bag of glands (metric) in NiPlatedBrass Ex e/i <sup>1)</sup>	A5E03907430	
Bag of glands (NPT) in black plastic <sup>2)</sup>	A5E03907435	
Bag of glands (NPT) in gray plastic Ex e/i <sup>2)</sup>	A5E03907451	
Bag of glands (NPT) in AISI 316 SS Ex e/i <sup>2)</sup>	A5E03907467	
Bag of glands (NPT) in NiPlatedBrass Ex e/i <sup>2)</sup>	A5E03907473	
Standard cable (non-Ex) with M12 plugs, PO insulation and PUR sleeve, gray, -40 +80 °C (-40 +176 °F)		
• 5 m (16.4 ft)	A5E03914805	
• 10 m (32.8 ft)	A5E03914850	
• 25 m (82 ft)	A5E03914853	
• 50 m (164 ft)	A5E03914859	
• 75 m (246 ft) • 150 m (492 ft)	A5E03914861 A5E03914874	
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 +80 °C (-40 +176 °F)  • 5 m (16.4 ft)  • 10 m (32.8 ft)  • 25 m (82 ft)	A5E03914833 A5E03914849 A5E03914854	
• 50 m (164 ft)	A5E03914856	
• 75 m (246 ft)	A5E03914864	
• 150 m (492 ft)	A5E03914873	

Description	Article No.	
Standard cable (Ex) with M12 plugs, PO insulation and PUR sleeve, blue, -40 +80 °C		
(-40 +176 °F)		
● 5 m	A5E03914929	
• 10 m	A5E03914962	
● 25 m	A5E03914995	
• 50 m	A5E03915004	
• 75 m	A5E03915074	
• 150 m	A5E03915088	
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 +80 °C (-40 +176 °F)		
• 5 m	A5E03914945	7
• 10 m	A5E03914973	
• 25 m	A5E03914984	
• 50 m	A5E03915015	
• 75 m	A5E03915057	
• 150 m	A5E03915100	
Suitcase for comprehensive sales support and training for FC430 It comes in a special suitcase with a fan implemented that allows the flowmeter to demonstrate airflow.	A5E31467598	
Suitcase for comprehensive sales support and training for FC410.  It comes in a special suitcase with an S7-1200 PLC and HMI touch-screen display. The operating code is open-source and can be copied to customers to assist with system integration.	A5E33219071	
Service toolkit for field maintenance of transmitter and sensor components. Contains all hand tools necessary for maintenance. Other tools may be required for installation.	A5E03722877	

# SITRANS F C

# Flowmeter - Accessories/Spare parts

Description	Article No.	
Heating Jacket, indoor use, 0 200 °C (32 392 °F) max. temperature. Complete with 5 m (16.4 ft) high tem- perature cable fitted. Dedi- cated plug connection to controller		
• 230 V AC		
- DN 15 electric	A5E33035287	
- DN 25 electric	A5E33035324	
- DN 50 electric	A5E33035325	
- DN 80 electric	A5E33035336	
• 115 V AC		
- DN 15 electric	A5E32877520	
- DN 25 electric	A5E32877556	
- DN 50 electric	A5E32877557	
- DN 80 electric	A5E32877561	
Heating jacket controller, IP65. Digital display for 0 200 °C (32 392 °F) control setpoint • 230 V AC	A5E03839193	
• 115 V AC	A5E03839194	

1) 2 pcs M20; 1 pce M25 wi	h single and dual cable inserts
----------------------------	---------------------------------

 $<sup>^{2)}</sup>$  2 pcs ½" NPT; 1 pce ½" NPT with single and dual cable inserts

Description	Dimension	Article No.
Mating parts for hygienic fittings	DN 10	FDK:085U1016
DIN 11851 Includes:	DN 15	FDK:085U1017
• 2 unions	DN 25	FDK:085U1019
<ul><li>2 mating parts (for welding in)</li><li>2 EPDM gaskets</li></ul>	DN 32	FDK:085U1020
Z Zi Zivi gaciloto	DN 40	FDK:085U1021
	DN 50	FDK:085U1022
	DN 65	FDK:085U1023
Mating parts for hygienic clamp	25 mm	FDK:085U1029
ISO 2852 Includes:	40 mm	FDK:085U1031
• 2 clamps	50 mm	FDK:085U1032
<ul><li>2 mating parts</li><li>2 EPDM gaskets</li></ul>		
2 EPDM gaskets with collar for	DN 10	FDK:085U1006
mounting set DIN 11851	DN 15	FDK:085U1007
	DN 25	FDK:085U1009
	DN 32	FDK:085U1010
	DN 40	FDK:085U1011
	DN 50	FDK:085U1012
	DN 65	FDK:085U1013

# Flowmeter - Accessories/Spare parts

Spare parts - transmitter	FCT030	
Description	Article No.	
Display and keypad assembly with firewire connection to the transmitter module <sup>1)</sup>	A5E03548971	
Sensor interface (Compact). Front end flow calculator and process detection. SIL 3 approved <sup>1)</sup>	A5E03549142	
Sensor interface (Remote); barrier unit for high speed digital communication and Ex ib power supply to remote front end DSL module	A5E03549098	
Display lid in painted alumi- num with Ex glass plate and o-ring seal	A5E03549344	
Transmitter cassette (active) with SIL approved 4 20 mA output and HART 7.2 <sup>1)</sup>	A5E03549357	
Transmitter cassette (passive) with SIL approved 4 20 mA output and HART 7.2 <sup>1)</sup>	A5E03549383	•
Bag of loose spare parts; including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and o-rings	A5E03549396	
Power supply 240 V AC, 47 63 Hz 24 90 V DC	A5E03549413	
Blind lid in painted aluminum with o-ring seal	A5E03549429	
I/O assembly Advise Order code F00 to F97 from Selection and Ordering data <sup>2)</sup>	A5E03939114	
SensorFlash (micro SD card)	A5E03915258	The state of

Description	Article No	
Description	Article No.	
Mounting bracket - FCT030; in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	A5E03906091	
M12 option for sensor housing in stainless steel. Pre- wired and potted to replace M12 socket in DSL housing	A5E03906095	
M12 option - remote - in painted aluminum. Pre- wired and potted replace- ment M12 connection for FCT030 transmitter remote version	A5E03906104	
Remote terminal house - M20	A5E03906112	P
Remote terminal house - NPT - in painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted	A5E03906130	•

# Spare parts - sensor FCS400

Description	Article No.	
Blind lid in painted aluminum with o-ring seal	A5E03549295	
Sensor link insert. Front end flow calculator and process detection. SIL 3 approved 1)	A5E03549191	
Sensor housing metric	A5E03549313	
Sensor housing NPT in painted aluminum	A5E03906080	
Bag of loose parts for sen- sor; including cable strain relief components, washer, seals, o-rings, and assorted screws	A5E03549324	m • O O 1

- The system firmware bundle must be stated in the "Remark" field to ensure compatibility of the system. The FW revision is found on the product label and in the local display menu items 3.1.10. e.g. "2.02.01-02"
- The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code "F40" for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input

### SITRANS F.C.

### Transmitter MASS 6000 IP67 compact/remote

### Overview



MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e. mass flow, volume flow, density, temperature and fraction

The MASS 6000 IP67 transmitter can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 40, and can be used in remote version for all types of MASS 2100/MC2 and FC300 sensors.

### Benefits

- · Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Digital input for batch control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes.
  - True "plug & play"

- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow.
- Fraction flow computation based on a 3rd-order algorithm matching all applications.
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted through true "plug & play"
  - Module and transmitter are automatically configured through the SENSORPROM.
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

#### Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

The main applications for the MASS 6000 IP67 transmitter can be found in:

- Food and beverage industries
- Pharmaceutical industries
- Automotive industry
- · Oil and gas industry
- · Power generation and utility industry
- Water and waste water industry

### Design

The transmitter is designed in an IP67/NEMA 6 compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40 (1/8" to  $1\frac{1}{2}$ ") and remote mounted for the entire sensor series.

The MASS 6000 IP67 is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

### Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- · Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- · Flow direction adjustable
- Error system consisting of error-log, error pending menu
- Display of operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

# Transmitter MASS 6000 IP67 compact/remote

Technical specifications	
Measurement of	Mass flow [kg/s (lb/min)],
meddarement of	volume flow [l/s (gpm)],
	fraction [%], °Brix, density [kg/m <sup>3</sup> , (lb/ft <sup>3</sup> )],
	temperature [°C (°F)]
Current output	
Current	0 20 mA or 4 20 mA
Load	< 800 Ω
Time constant	0 99.9 s adjustable
Digital output	
Frequency	0 10 kHz, 50 % duty cycle
Time constant	0 99.9 s adjustable
Active	24 V DC, 30 mA,
	1 $K\Omega \le R_{load} \le 10 K\Omega$ , short-circuit-protected
Passive	3 30 V DC, max. 110 mA,
Dalass	250 Ω ≤ R <sub>load</sub> ≤ 10 ΚΩ
Relay	Change average:
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, flow direction
Digital input	11 30 V DC ( $R_i = 13.6 \text{ k}\Omega$ )
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated.
	Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	<ul> <li>Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1</li> <li>Reverse flow indicated by negative sign</li> </ul>
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 +50 °C (-4 +122 °F),
	max. rel. humidity 80 % at 31 °C (87.8 °F) decreasing to 50 % at 40 °C (104 °F) according to IEC/EN/UL 61010-1
Storage	-40 +70 °C (-40 +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1

Enclosure	
Material	Fibre glass reinforced polyamide
Rating	IP67/NEMA 6
Mechanical load	18 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-2-36
Supply voltage	
24 V version	
• Supply	18 30 V DC 20 30 V AC
230 V version	
• Supply	87 253 V AC, 50 60 Hz
Power consumption	
24 V DC	6 W
24 V AC	10 VA
230 V AC	9 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
EMC performance	
Emission	EN/IEC 61326-1-4 (Industry)
Immunity	EN/IEC 61326-1-2 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to	Altitude up to 2000 m
IEC/EN/UL 61010-1:	• POLLUTION DEGREE 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	Two types of cable gland are available in polyamide in the following dimensions: M20 or ½" NPT

# SITRANS F C

# Transmitter MASS 6000 IP67 compact/remote

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 frq./pulse output, 1 relay output and connection board/PCB)	7 M E 4 1 1 0 -
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Version Remote IP67/NEMA 6 enclosure	2
Supply voltage	
115/230 V AC, 50 60 Hz 24 V AC/DC	1 2
Display/Keypad	
with display	1
Serial communication	
No communication	Α
HART PROFIBUS PA Profile 3 PROFIBUS DP Profile 3	B F G
Modbus RTU RS 485 DeviceNet FOUNDATION Fieldbus H1	E H J
Cable glands	
M20 ½" NPT	1 2

# Operating instructions for SITRANS F C MASS 6000 IP67

Description	Article No.
English	A5E03071936

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

# Accessories

Description	Article No.	
Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2 pcs.		
• M20	A5E00822490	COMPANY OF THE PARKS
• ½" NPT	A5E00822501	
Sun lid for MASS 6000 transmitter (Frame and lid)	A5E02328485	SIEMENS

### Add-on module

Description	Article No.	
HART <sup>1)</sup>	FDK:085U0226	
PROFIBUS PA Profile 31)	FDK:085U0236	
PROFIBUS DP Profile 3	FDK:085U0237	SIEMENS HART CE
Modbus RTU RS 485	FDK:085U0234	Code no FCH-0001,m2pt
FOUNDATION Fieldbus H1 <sup>1)</sup>	A5E02054250	
DeviceNet	FDK:085U0229	

- 1) Modules are rated Ex i when used with MASS 6000 Ex d.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

# Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART		
<ul><li>English</li></ul>	A5E03089708	
PROFIBUS PA/DP		
<ul><li>English</li></ul>	A5E00726137	
German	A5E01026429	
Modbus		
<ul><li>English</li></ul>	A5E00753974	
<ul> <li>German</li> </ul>	A5E03089262	
<ul><li>Spanish</li></ul>	A5E03089278	
• French	A5E03089265	
FOUNDATION Fieldbus		
<ul><li>English</li></ul>	A5E02318728	
<ul> <li>German</li> </ul>	A5E02488856	
<ul> <li>Spanish</li> </ul>	A5E02512177	
• French	A5E02512169	
DeviceNet		
<ul><li>English</li></ul>	A5E03089720	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

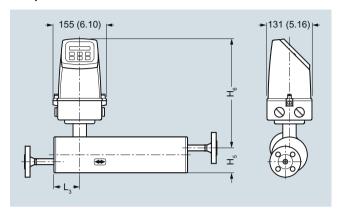
# Spare parts for compact or remote IP67 version

Description	Article No.	
MASS 6000 transmitter IP67/NEMA 6		
Fibre glass reinforced poly- amide and without connec- tion board		
1 current output 1 frq./pulse output 1 relay output		Andrew Co.
• 115/230 V AC, 50/60 Hz	7ME4110- 1AA10-1AA0	
• 24 V AC/DC	7ME4110- 1AA20-1AA0	
Wall mounting unit for IP67/NEMA 6 version with wall bracket, without connection board but with		
• 4 x M20 cable glands	FDK:085U1018	(0)
• 4 x ½" NPT cable glands	A5E01164211	0 0
Connection board/PCB Supply voltage: 115/230 V/24 V AC/DC	FDK:083H4260	

# Transmitter MASS 6000 IP67 compact/remote

Description	Article No.	
Terminal box kit with		
<ul> <li>M20 cable glands</li> </ul>	A5E00832338	
• 1/2" NPT cable glands	A5E00832342	
Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100.  The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor.		
Not approved for hazardous locations		
Terminal box, in polyamide, inclusive lid		
M20 cable glands	FDK:085U1050	
• ½" NPT cable glands	FDK:085U1052	
Not approved for hazardous locations		
<b>Terminal box</b> – <b>lid</b> in polyamide	FDK:085U1003	
● Siemens Front	FDK:085U1039	

# Dimensional drawings Compact

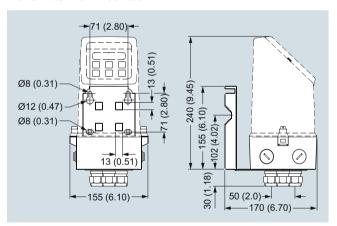


Dimensions in mm (inch)

# MASS 2100

Sensor size [Di (inch)]	L <sub>3</sub> [mm (inch)]	H <sub>5</sub> [mm (inch)]	H <sub>6</sub> [mm (inch)]	H <sub>5</sub> + H <sub>6</sub> [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (1/4)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

### Transmitter wall mounted



SITRANS F C

# Transmitter MASS 6000 IP67 compact/remote

# Schematics

# Electrical connection

### Grounding

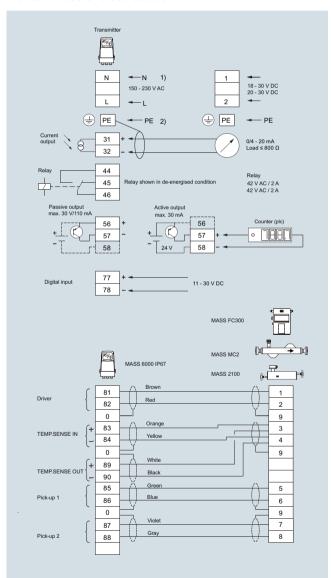
PE must be connected due to safety class 1 power supply.

# Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000  $\mu$ F capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

### Output cables

If long cables are used in a noisy environment, it is recommended to use shielded cables.



# Transmitter MASS 6000 for 19" insert/19" wall mounting

### Overview



MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multi parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

The MASS 6000 19" transmitter can be connected to all sensors of types MASS 2100/MC2/FC300/FCS200 and are available in different versions depending of number of output facilities, Ex protection and grade of enclosure.

# Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Many output capacities, up to 3 current, 2 frequency/pulse and 2 relay outputs (excludes the possibility of an add-on module)
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset

- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes. True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM.
- Transmitter available with ATEX and UL approval
- All electrical connections are easily accessible on the large back plane PCB

### Application

SITRANS F C Coriolis mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter can measure both liquids and gases.

The main applications for the MASS 6000 19" transmitter can be found in:

- · Chemical and pharmaceutical industries
- Food and beverage industries
- · Automotive industry
- · Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

# Design

The transmitter is designed as a 19" insert as base to be used in:

- 19" rack system
- Panel mounting IP65
- Back of panel mounting IP20
- Wall mounting IP66

The MASS 6000 19" is available as standard or as ATEX-approved transmitter which is to be mounted in the safe area.

### SITRANS F.C.

# Transmitter MASS 6000 for 19" insert/19" wall mounting

# Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 2 output versions available as standard:
  - 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
  - 3 current outputs, 2 frequency/pulse outputs, 2 relay outputs,
     1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- · Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- · Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed-back
- Full service menu for effective and straight forward application and meter troubleshooting

### Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³ (lb/ft³)], temperature [°C (°F)]
Current output	
Current	0 20 mA or 4 20 mA
Load	< 800 Ω
Time constant	0 99.9 s adjustable
Digital output	
Frequency	0 10 kHz, 50 % duty cycle
Time constant	0 30 s adjustable
Active	24 V DC, 30 mA, $1 \ K\Omega \le R_{load} \le 10 \ K\Omega, \ short-circuit-protected$
Passive	3 30 V DC, max. 110 mA, 250 $\Omega$ $\leq$ R <sub>load</sub> $\leq$ 10 K $\Omega$
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, direction
Digital input	11 30 V DC
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galva- nically isolated.
	Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 9.9 % of maximum flow

Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	<ul> <li>Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults</li> <li>Reverse flow indicated by negative sign</li> </ul>
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 +50 °C (-4 +122 °F)
Storage	-40 +70 °C (-40 +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1
Enclosure 19"	
Material	Aluminum/steel (DIN 41494)
Rating	IP20
Mechanical load	18 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-2-36
Supply voltage	
24 V version	
• Supply	24 V DC/AC, 50 60 Hz
Fluctuation	18 30 V DC 20 30 V AC
Power consumption	10 W $I_N = 250 \text{ mA}, I_{ST} = 2 \text{ A (30 ms)}$
230 V version	
• Supply	87 253 V AC, 50 60 Hz
Power consumption	26 VA
<b>Fuse</b> 230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
Power consumption	
230 V AC	9 VA max.
24 V DC	6 W
EMC performance	
Emission	EN/IEC 61236-1-4 (Industry)
Immunity	EN/IEC 61236-1-2 (Industry)
Ex approval	[Ex ia] IIC, DEMKO 03 ATEX 135251X
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable	<ul> <li>Max. 300 m</li> <li>C: max. 300 [pF/m]; L<sub>C</sub>/R<sub>C</sub>: max. 100 [μH/Ω]</li> <li>The total cable capacity must be max. 200 nF.</li> </ul>
Cable glands	The cable gland is available in polyamide, in dimension: PG 13.5

# Transmitter MASS 6000 for 19" insert/19" wall mounting

#### Selection and Ordering data Article No. SITRANS F C MASS 6000 transmitter 7ME4110-Transmitter for rack and wall mounting, incl. con-2 - - A 0 tion in the PIA Life Cycle Portal. Enclosure 19 inch insert IP20 (rack mount, purchase rack С separately) 19 inch insert in IP65 (wall mount, enclosure Ε included) **Output configuration** 1 current, 1 frequency, 1 relay 3 current, 2 frequency, 2 relay С Supply voltage 115/230 V AC, 50/60 Hz 24 V AC/DC 2 Ex Approvals Standard (No Ex-approval) 0 **ATEX** Display/Keypad With display Serial communication (Only possible to connect to MASS 6000 version with 1 current output) No communication HART В PROFIBUS PA Profile 3 PROFIBUS DP Profile 3 G Modbus RTU RS 485 Ε DeviceNet Н FOUNDATION Fieldbus H1

# Attention (Ex applications)!

MC2 Ex version sensors must only be connected to MASS 6000 standard. The MASS 6000 connection board must be replaced by a connection board approved FDK:083H4294 or FDK:083H4295 (see connection boards/PCB for MASS 6000 and MC2 sensors).

### Operating instructions for SITRANS F C MASS 6000 19"

Description	Article No.
• English	A5E02944875

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\bar{\mathsf{F}}$  iterature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Enclosure (without PCB, connection board)

Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	

### Enclosure

Description	Article No.	
Panel mounting enclosure for 19" insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK:083F5030	
Panel mounting enclosure for 19" insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK:083F5031	
Back of panel mounting enclosure for 19" insert (21 TE); IP20/NEMA 1 enclo- sure in aluminum	FDK:083F5032	
Back of panel mounting enclosure for 19" insert (42 TE); IP20/NEMA 1 enclo- sure in aluminum	FDK:083F5033	É
Front cover (7TE) for panel mounting enclosure	FDK:083F4525	

### Cable glands

Description	Article No.	
Cable gland, screwed entry, type M20, in polyam- ide (100 °C (212 °F)) black, 2 pcs.	A5E00822490	

# SITRANS F C

# Transmitter MASS 6000 for 19" insert/19" wall mounting

# Add-on module

Note:

Only possible to connect to MASS 6000 versions with 1 current output.

Description	Article No.	
HART (Ex-i)	FDK:085U0226	
PROFIBUS PA Profile 3 (Ex-i)	FDK:085U0236	N
PROFIBUS DP Profile 3	FDK:085U0237	SIEMENS PROFIBUS PA CE
Modbus RTU RS 485	FDK:085U0234	TOR. OR LANDS
FOUNDATION Fieldbus H1 (Ex-i)	A5E02054250	
DeviceNet	FDK:085U0229	

# Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART • English	A5E03089708	
PROFIBUS PA/DP • English • German	A5E00726137 A5E01026429	
Modbus • English • German • Spanish • French	A5E00753974 A5E03089262 A5E03089278 A5E03089265	
FOUNDATION Fieldbus  • English  • German  • Spanish  • French	A5E02318728 A5E02488856 A5E02512177 A5E02512169	
DeviceNet • English	A5E03089720	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

### Connection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4272	
Connection board MASS 6000 Ex [ia] IIC for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4273	
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4274	The second secon
Connection board MASS 6000 Ex [ia] IIC for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4275	

### Connection boards/PCB for MASS 6000 and MC2 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4272	
Connection board MASS 6000 for Ex application <sup>1)</sup> and 19" IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)	24 V 115/230 V	FDK:083H4294	
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4274	Contraction
Connection board MASS 6000 for Ex application <sup>1)</sup> and 19" wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4295	

<sup>1)</sup> Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

Description	Article No.	
Wall mounting enclosure in ABS plastic IP65 with con- nection board/PCB for Ex application connected to MC2 Ex sensors	FDK:083H4296	

Transmitter MASS 6000 for 19" insert/19" wall mounting

# Spare parts 19" versions

Enclosure (without PCB, connection board)

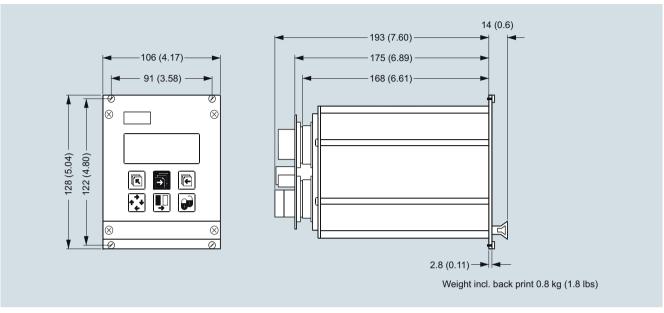
Description	Article No.	
	Alticle No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	
Display unit for 19" versions Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display for replacement	FDK:085U1039	

SITRANS F C

# Transmitter MASS 6000 for 19" insert/19" wall mounting

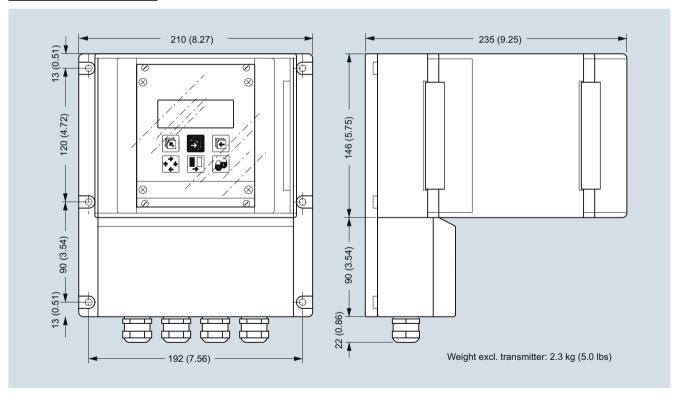
# Dimensional drawings

Transmitter 19" insert



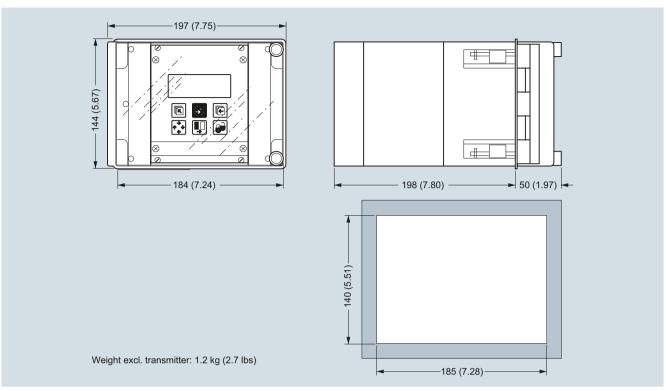
Dimensions in mm (inch)

Transmitter 19" wall mounting



# Transmitter MASS 6000 for 19" insert/19" wall mounting

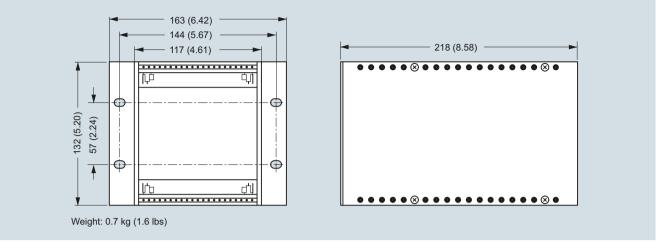
# Transmitter 19" front of panel



SITRANS F C

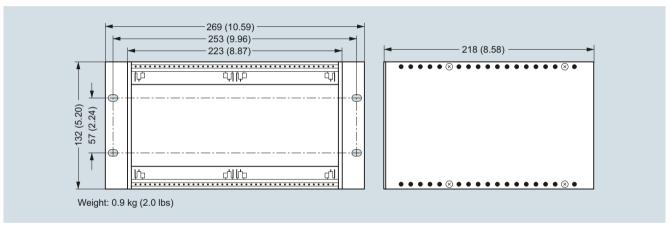
# Transmitter MASS 6000 for 19" insert/19" wall mounting

# Transmitter, back of panel IP20/NEMA 1, 21 TE



Dimensions in mm (inch)

# Transmitter, back of panel IP20/NEMA 1, 42 TE



Transmitter MASS 6000 for 19" insert/19" wall mounting

# Schematics

# Electrical connection

#### Grounding

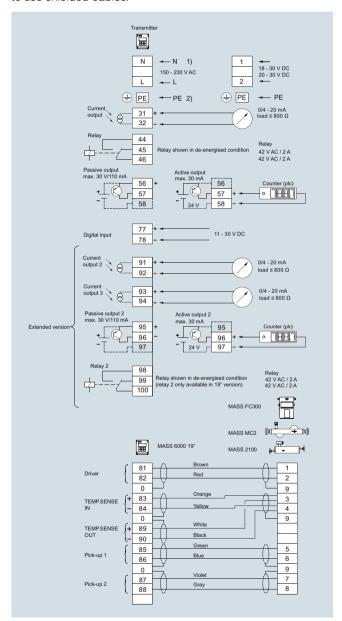
PE must be connected due to safety class 1 power supply.

# Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a  $1000~\mu F$  capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

### Output cables

If long cables are used in noisy environment, it is recommended to use shielded cables.



### SITRANS F C

### Transmitter MASS 6000 Ex d compact/remote

### Overview



MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 Ex d transmitter is manufactured in stainless steel (AISI 316L/1.4404) and able to withstand harsh installation conditions in hazardous applications within the process and chemical industry. The conservative choice of material guarantees the user a low cost of ownership and a long trouble-free lifetime.

The Ex d can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 40, and can be used in remote version for all types of MASS 2100. MASS 6000 Ex d cannot be combined with MC2 sensors.

### Benefits

- Fully stainless steel flameproof Ex d enclosure, ensuring optimum cost of ownership
- Intrinsically safe keypad and display directly programmable in hazardous area
- ATEX-approved transmitter which can be mounted in hazardous area Zone 1 or Zone 2.
- Sensor and transmitter interface intrinsically safe Ex ia IIC
- Exchange of transmitter directly in hazardous area without shut-down of process pipe line due to ia IIC sensor/transmitter interface
- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- 1 current output, 1 frequency/pulse and 1 relay as standard output
- Current output can be selected as passive or active output

- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
- 3 lines, 20 characters display in 11 languages
- Self-explaining error handling/log in text format
- Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
- Factory pre-programming with calibration data, pipe size, sensor type, output settings
- Any values or settings changed by users are stored automatically
- Automatically re-programming any new transmitter without loss of accuracy
- Transmitter replacement in less than 5 minutes. True "plug & play"
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality:
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

### Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry where there is a demand for accurate flow measurement in hazardous area. The meter can measure both liquids and gases.

The main applications for the MASS 6000 Ex d transmitter can be found in:

- · Chemical process industry
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- · Power generation and utility industry

### Design

The transmitter is designed in an Ex d compact stainless steel enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40, and remote mounted for the entire sensor series except MC2.

The MASS 6000 Ex d is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

- Flameproof "d" enclosure
- Enclosure stainless steel, IP67/NEMA 6 as compact and IP65 as remote
- Supply voltage 24 V AC/DC
- MASS 6000 Ex d is ATEX approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

# Transmitter MASS 6000 Ex d compact/remote

# Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- · Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- · Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

# Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³ (lb/ft³)], temperature [°C (°F)]
Current output	Classified Ex ia, selectable as active or passive outputs. Default setting is active mode.
Current	0 20 mA or 4 20 mA
Load	< 350 Ω
Time constant	0 99.9 s adjustable
Current characteristics	
Active mode	$U_o = 24 \text{ V, } I_o = 82 \text{ mA,} \\ P_o = 0.5 \text{ W, } C_o = 125 \text{ nF,} \\ L_o = 2.5 \text{ mH}$
Passive mode (max input from external barrier)	$U_i = 30 \text{ V, } I_i = 100 \text{ mA,} \ P_i = 0.75 \text{ W, } C_i = 52 \text{ nF,} \ L_i = 100  \mu\text{H}$
Digital output	
Frequency	0 10 kHz, 50 % duty cycle
Time constant	0.1 30 s adjustable
Passive	6 30 V DC, max. 110 mA, 1 K $\Omega$ $\leq$ R <sub>load</sub> $\leq$ 10 k $\Omega$
Output characteristics	
Active mode	Not available
Passive mode (max input from external barrier)	$U_i = 30 \text{ V, } I_i = 100 \text{ mA,} \\ P_i = 0.75 \text{ W, } C_i = 52 \text{ nF,} \\ L_i = 100  \mu\text{H}$
Relay	
Туре	Change-over relay
Load	30 V/100 mA
Functionality	Error level, error number, limit, direction
Output characteristics	$U_i = 30 \text{ V}, I_i = 100 \text{ mA},$ $P_i = 0.75 \text{ W}, C_i = 0 \text{ nF}, L_i = 0 \text{ mH}$

Digital input	11 30 V DC (R <sub>i</sub> = 13.6 kΩ)		
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output		
Output characteristics	$U_i = 30 \text{ V}, I_i = 3.45 \text{ mA}, P_i = 0.10 \text{ W}, C_i = 0 \text{ nF}, L_i = 0 \text{ mH}$		
Galvanic isolation	All inputs and outputs are galva- nically isolated.		
	Isolation voltage:  • 500 V to supply  • 50 V between outputs		
Cut-off			
Low-flow	0 9.9 % of maximum flow		
Empty pipe	Detection of empty sensor		
Density	0 2.9 g/cm <sup>3</sup>		
Totalizer	Two eight-digit counters for forward, net or reverse flow		
Display	<ul> <li>Background illumination with al- phanumerical text, 3 × 20 char- acters to indicate flow rate, totalized values, settings and faults. Time constant as current output</li> </ul>		
	<ul> <li>Reverse flow indicated by negative sign</li> </ul>		
Zero point adjustment	Via keypad or remote via digital input		
Ambient temperature			
Operation	-20 +50 °C (-4 +122 °F)		
Storage	-40 +70 °C (-40 +158 °F) (Humidity max. 95 %)		
Communication	Add-on modules: HART, PROFIBUS PA, FOUNDATION Fieldbus H1		
HART			
Active mode	$U_{o} = 6.88 \text{ V, } I_{o} = 330 \text{ mA,} \ P_{o} = 0.57 \text{ W, } C_{o} = 20 \text{ nF,} \ L_{o} = 100  \mu\text{H}$		
Passive mode (max input from external barrier)	$\begin{array}{l} U_i = 10 \text{ V},  I_i = 200 \text{ mA},  P_i = 0.5 \text{ W}, \\ C_i = 0 \text{ nF},  L_i = 0  \mu\text{H} \end{array}$		
PROFIBUS PA			
Active mode	Not available		
Passive mode	$U_i = 17.5 \text{ V}, I_i = 380 \text{ mA}, \\ P_i = 5.32 \text{ W}, C_i = 5 \text{ nF}, L_i = 10 \mu\text{H}$		
FOUNDATION Fieldbus H1			
Active mode	Not available		
Passive mode	$U_i = 17.5 \text{ V}, I_i = 380 \text{ mA}$		
Enclosure			
Material	Stainless steel AISI 316/1.4435		
Rating	Compact mounted on sensor: IP67/NEMA 4X     Remote mounted: IP65		
Load	18 1000 Hz random, 1.14 g RMS, in all directions, to IEC 68-2-36, Curve E		

# SITRANS F C

# Transmitter MASS 6000 Ex d compact/remote

Supply voltage			
24 V AC			
• Range	20 30 V AC		
Power consumption	6 VA $I_N = 250 \text{ mA}, I_{ST} = 2 \text{ A}$ (30 ms)		
Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm <sup>2</sup>		
24 V DC			
• Range	18 30 V DC		
Power consumption	6 W $I_N$ = 250 mA, $I_{ST}$ = 2 A (30 ms)		
• Power supply	The power supply shall be from safety isolating transformer. Maximal cable core is 1.5 mm <sup>2</sup> .		
EMC performance			
Emission	EN/IEC 61326-1-4 (Industry)		
Immunity	EN/IEC 61326-1-2 (Industry)		
NAMUR	Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21		
Ex approval	Ex de [ia/ib] IIC T6, DEMKO 03 ATEX 135253X		
Temperature class:	Process liquid temperature:		
• T6	• T < 85 °C (185 °F)		
• T5	• 85 °C < T < 100 °C (185 °F < T < 212 °F)		
• T4	• 100 °C < T < 135 °C (212 °F < T < 275 °F)		
• T3	• 135 °C < T < 180 °C (275 °F < T < 356 °F)		

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter Ex d for remote mounting inclusive of wall mounting kit	7 M E 4 1 1 0 -
Enclosure	
Ex d SS with 5 m (16.5 ft) cable	G
Ex d SS with 10 m (32.8 ft) cable	Н
Ex d SS with 25 m (82.0 ft) cable	J
Output configuration	
1 current, 1 frequency, 1 relay	Α
Supply voltage	
24V AC/DC	2
Ex approvals	
ATEX	1
Display/Keypad	
With display	1
Serial communication	
No communication	A
HART	В
PROFIBUS PA Profile 3	F
FOUNDATION Fieldbus H1	J
Cable gland M20	1

# Operating instructions for SITRANS F C MASS 6000 Ex d

Description	Article No.
• English	A5E02944883

This device is shipped with a Quick Start guide and a CD containing further SITRANS F iterature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

Only communication modules with Ex approvals are allowed.

# Transmitter MASS 6000 Ex d compact/remote

# Selection and Ordering data

### Accessories

Add-on module for remote and compact MASS 6000 Ex d

Description	Article No.	
HART (Ex-i)	FDK:085U0226	
PROFIBUS PA Profile 3 (Ex-i)	FDK:085U0236	N N
FOUNDATION Fieldbus H1 (Ex-i)	A5E02054250	SHEMENS PROFIBES PACC PROFILE 3

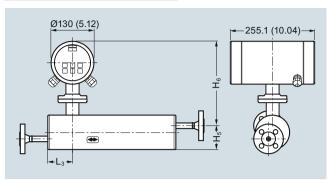
### Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART		
<ul><li>English</li></ul>	A5E03089708	
PROFIBUS PA/DP		
<ul> <li>English</li> </ul>	A5E00726137	
<ul> <li>German</li> </ul>	A5E01026429	
FOUNDATION Fieldbus		
<ul> <li>English</li> </ul>	A5E02318728	
<ul> <li>German</li> </ul>	A5E02488856	
<ul><li>Spanish</li></ul>	A5E02512177	
• French	A5E02512169	
This daying is shipped with a O	uial Ctart auida a	and a CD containing

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

# Dimensional drawings

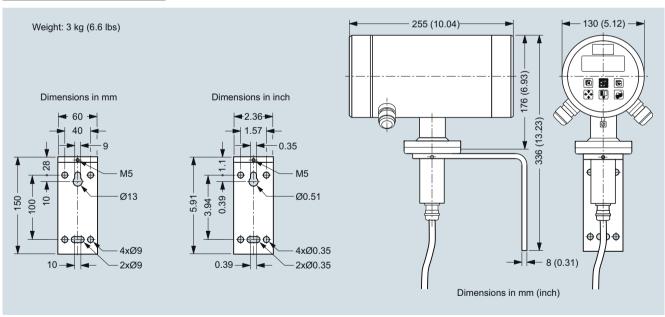
MASS 6000 Ex d compact version



DImensions in mm (inch)

Sensor size [Di (inch)]	L <sub>3</sub> [mm (inch)]	H <sub>5</sub> [mm (inch)]	H <sub>6</sub> [mm (inch)]	H <sub>5</sub> + H <sub>6</sub> [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (1/4)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1½)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

# MASS 6000 Ex d remote version

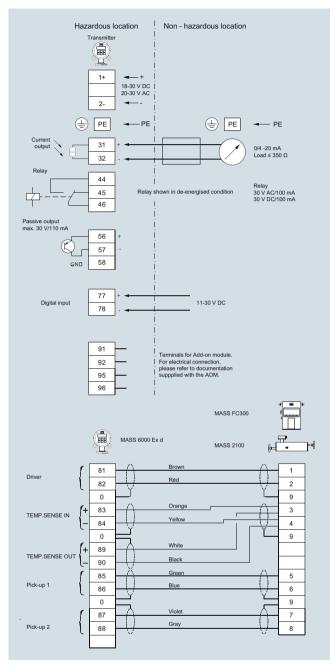


SITRANS F C

# Transmitter MASS 6000 Ex d compact/remote

# Schematics

# Electrical connection compact or remote



#### **Transmitter SIFLOW FC070**

#### Overview



SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, MC2, FCS200 and FC300.

#### Benefits

- · Easy integration in SIMATIC S7 and PCS 7
- Support of SIMATIC PDM configuration tool via Modbus
- Dedicated mass flow chip with high-performance ASIC technology
- True 30 Hz update rate securing fast batching and step response
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnostics enhancing troubleshooting and meter verification
- Built-in batch controller with two-stage control and compensation
- Digital outputs for direct batch control, frequency/pulse
- Modbus RTU RS 232/RS 485 interface for connection to SIMATIC PDM or any other Modbus master

- · Digital input for batch control, zero adjust
- Extensive simulation options for measurement values, I/O and errors easy communication/fault-finding
- Multiple LED's for easy indication of flow, error and I/O state
- SENSORPROM technology automatically configures the transmitter during start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type and I/O settings
  - Any values or settings changed by the user is stored automatically
  - Automatically re-programming of a new transmitter, without loss of settings and accuracy
  - Transmitter replacement in less than 30 seconds
- Four-wire Pt1000 measurement ensuring optimum accuracy mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- SIFLOW FC070 Ex CT is Custody transfer approved, according to OIML R 139 (Compressed gaseous fuel measuring systems for vehicles), when using the redundant digital output or the encrypted ActiveX component for SIMATIC touch panels.
- Free of charge ActiveX component for SIMATIC touch panels, enables encrypted sensor process values to be communicated between SIFLOW FC070 Ex CT and SIMATIC touch panels

#### Application

SIFLOW FC070 mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meters are suitable for measuring on liquid and gas.

The main applications for the SIFLOW FC070 transmitter can be found in the following industries:

- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- · Water and waste water

## Design

SIFLOW FC070 is designed in an IP20 SIMATIC S7-300 enclosure and for use in central and de-central cabinets where sensors: FCS200, FC300, MASS 2100 and MC2 are remotely mounted.

#### Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- · Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Automatic zero point adjustment with zero point evaluation feed back
- Configurable upper and lower alarm and warning limits for all process values
- · Comprehensive status and error reporting

SITRANS F C

# Transmitter SIFLOW FC070

Technical specifications			
Measurement of	Mass flow, volume flow, density,	Power	
	sensor temperature, fraction A flow, fraction B flow, fraction A in %	Supply	24 V DC nominal
Measurement functions	,	Tolerance	20.4 V DC 28.8 V DC
Totalizer 1	Totalization of mass flow, volume-	Consumption	Max. 7.2 W
.o.ao.	flow, fraction A, fraction B	Fuse	T1 A/125 V, not replaceable by
• Totalizer 2	Totalization of mass flow, volume- flow, fraction A, fraction B		operator
Single and 2-stage batch function	Batching function with the use of	Environment	
Single and 2-stage batch function	one or two outputs for dosing in high and low speed	Ambient temperature	• Storage -40 +70 °C (-40 +158 °F)
• 4 programmable limits	4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.	Operation conditions	Horizontally mounted rail. For SIFLOW FC070 Std.: 0 60 °C (32 140 °F) For SIFLOW FC070 Ex CT: -40 +60 °C (-40 +140 °F) Vertically mounted rail For SIFLOW FC070 Std.:
Digital input			0 45 °C (32 113 °F)
Functions	Start batch, stop batch, start/stop batch, hold/continue batch,		For SIFLOW FC070 Ex CT: -40 +45 °C (-40 +113 °F)
	reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze fre-	Altitude	• Operation: -1000 2000 m (pressure 795 1080 hPa)
	quency output	Enclosure	
High signal	Nominal voltage: 24 V DC	Material	Noryl, color: anthracite
	<ul><li>Lower limit: 15 V DC</li><li>Upper limit: 30 V DC</li><li>Current: 2 15 mA</li></ul>	Rating	IP20/NEMA 2 according to IEC 60529
Low signal	Nominal voltage: 0 V DC  Lower limit: -3 V DC	Mechanical load	According to SIMATIC standards (S7-300 devices)
	Upper limit: 5 V DC	Approvals Ex	
	• Current: -15 +15 mA	SIFLOW FC070 Standard	CE, C-UL, ATEX II 3G Ex nA IIC
Input Switching	Approx. 10 k $\Omega$ Max. 100 Hz.	SIFLOW FC070 Ex CT	CE, C-UL, UL Haz.Loc., FM Class I, Div. 2 Groups A, B, C,
Digital output 1 and 2			ATEX II (1)G [Ex ia] IIC Ga / II 3G Ex nA IIC T4 Gc and IECEx Ex nA
Functions	<ul> <li>Output 1: Pulse, frequency, redundancy</li> </ul>		[ia] IIC T4
	pulse, redundancy frequency 2-stage batch, batch • Output 2: Redundancy pulse, redundancy frequency, 2-stage batch	Approvals Custody transfer SIFLOW FC070 Ex CT	PTB Germany approval no.: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles
Voltage supply	3 30 V DC (passive output)	Electromagnetic compatibility	Requirements of EMC law;
Switching current	Max. 30 mA at 30 V DC		Noise immunity according to
Voltage drop	≤ 3 V DC at max. current		EN/IEC 61326-1 Emitted interference according to
Leakage current	≤ 0.4 mA at max. voltage 30 V DC		EN 55011/CISPR-11
Load resistance	1 10 kΩ	NAMUR	Within the limits according to "General recommendations" with
Switching frequency	0 12 kHz 50 % duty cycle		error criteria A in accordance with
Functions	Pulse, frequency, redundancy	Drogramming to als	NE 21
	pulse, redundancy frequency 2-stage batch, batch	Programming tools SIMATIC S7	Configuration through booksland
Communication Modbus RS 232C	, , , , , , , , , , , , , , , , , , ,	SIMATIC 5/	Configuration through backplane P-BUS, PLC program and WinCC flexible
INIOUDUS NO ZOZO	Max. baud rate: 115 200 baud     Max. line length: 15 m at     115 200 baud	SIMATIC PCS7	Configuration trough backplane P- BUS and PLC/WinCC faceplates, certified driver
	Signal level: according to EIA-RS 232C	SIMATIC PDM	Through Modbus port RS 232C and RS 485, certified driver
Modbus RS 485	<ul> <li>Max. baud rate: 115 200 baud</li> <li>Max. line length: 1200 m at 115 200 baud</li> <li>Signal level: according to EIA-RS 485</li> <li>Bus termination: Integrated. Can be enabled by inserting wire jumpers.</li> </ul>		
Galvanic isolation	All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V		

Accessories

## Flow Measurement SITRANS F C

## **Transmitter SIFLOW FC070**

Selection and Ordering data		
Description	Article No.	
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	7ME4120-2DH20-0EA0	
40 pin front plug with screw contacts	6ES7392-1AM00-0AA0	
40 pin plug with spring contacts	6ES7392-1BM01-0AA0	
SIFLOW FC070 Ex CT flow transmitter Remember to order 20 pin front plug connector.	7ME4120-2DH21-0EA0	
20 pin plug with spring contacts	6ES7392-1BJ00-0AA0	
20 pin front plug with screw contacts	6ES7392-1AJ00-0AA0	

## Operating instructions for SITRANS F C SIFLOW FC070

Description	Article No.	
SIFLOW FC070 system manual		
• English	A5E00924779	
• German	A5E00924776	
SIFLOW FC070 with S7		
• English	A5E02254228	
• German	A5E02665536	
• French	A5E02591639	
SIFLOW FC070 with PCS7		
• English	A5E03694109	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F iterature.

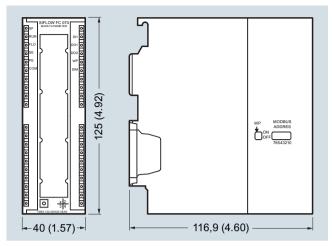
All literature is also available for free at: http://www.siemens.com/flowdocumentation

Description	Article No.	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors, $5 \times 2 \times 0.34 \text{ mm}^2$ twisted and screened in pairs. Temperature range -20 +110°C (-4 +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:083H3054	
• 150 m (492 ft)	FDK:083H3055	
Cable without multiplug for connecting MC2 sensors, 5 × 2 × 0.34 mm² twisted and screened in pairs. Temperature range -20 +110°C (-4 +230 °F)		
• 10 m (32.8 ft)	FDK:083H3001	
• 25 m (82 ft)	FDK:083H3002	
• 75 m (246 ft)	FDK:083H3003	
• 150 m (492 ft)	FDK:083H3004	
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300		
• 160 mm (6.3")	6ES7390- 1AB60-0AA0	
• 482 mm (18.9")	6ES7390- 1AE80-0AA0	
• 530 mm (20.8")	6ES7390- 1AF30-0AA0	
• 830 mm (32.7")	6ES7390- 1AJ30-0AA0	
• 2000 mm (78.7")	6ES7390- 1BC00-0AA0	
SIFLOW FC070 Demo suit- case with MASS 2100 DI 1.5 sensor and SIMATIC HMI TP 177B touch panel	A5E01075465	
SIMATIC S7-300, stabilized power supply PS307 Input: 120/230 V AC Output: 24 V DC/2 A	6ES7307- 1BA01-0AA0	

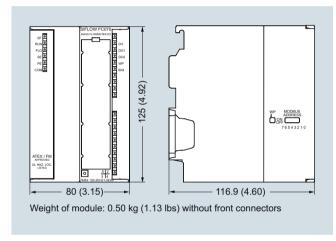
SITRANS F.C.

## **Transmitter SIFLOW FC070**

#### Dimensional drawings

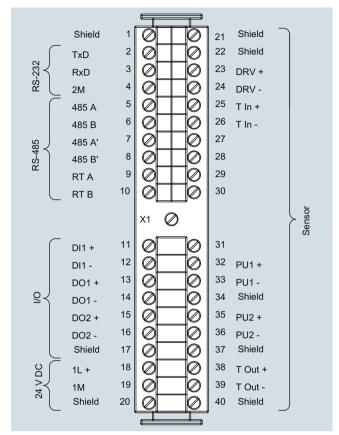


SIFLOW FC070, dimensions in mm (inch)

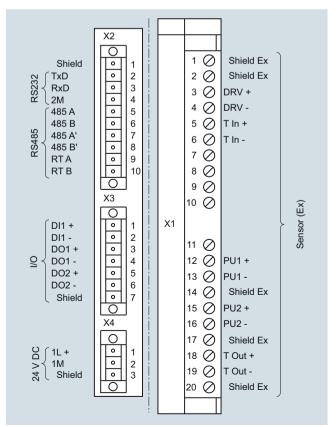


SIFLOW FC070 Ex CT, dimensions in mm (inch)

## Schematics



SIFLOW FC070, electrical connection



SIFLOW FC070 Ex CT, electrical connection

Flow sensor SITRANS FCS200

#### Overview



SITRANS FCS200 (DN10, DN 15 and DN 25) is a Coriolis sensor specialized for accurate mass flow measurement of gases.

The sensor offers superior performance in terms of flow accuracy and turn down ratio. The ultra compact sensor design makes installation, replacement and commissioning very straight forward and easy.

#### Benefits

- · High accuracy gas measurement
- Approved for use in hazardous area
- DN 10 and DN 15 is custody transfer approved, according to OIML R 139 (Compressed gaseous fuel measuring systems for vehicles). For custody transfer applications SIFLOW FC070 Ex CT must be used.
- Self-draining in vertical orientation
- Pt1000 temperature measurement for optimum accuracy
- SENSORPROM enabling true "plug & play"
- Rigid enclosure design reducing influence from pipeline vibration and thermal stress
- High-pressure measurement up to 350 bar (5076 psi)
- Ultra compact sensor design with space-saving split flow

## Application

SITRANS FCS200 is designed for measurement of gases and is suitable for use in the oil and gas industry:

- · Filling of gas bottles
- CNG dispensers
- Metering of general gas applications

#### Design

SITRANS FCS200 is available in DN 10, DN 15 and DN 25.

The sensor consists of 2 parallel measuring pipes, welded directly onto a flow splitter at each end of the sensor to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations. The flow-splitters are welded directly onto a rigid sensor housing which acts as a mechanical low pass filter.

The SITRANS FCS200 DN 10 and DN 15 wetted parts material is Hastelloy C22, and the DN 25 wetted parts material is AISI 316Ti/1.4571. The enclosure is made of stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The two black rupture discs are designed to protect the enclosure from overpressure.

## Function

The flow measuring principle is based on the Coriolis effect. See "System information SITRANS F C".

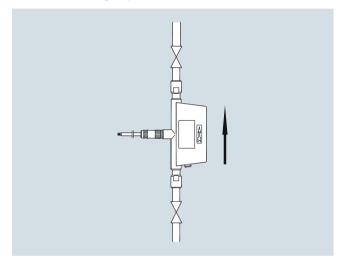
## Integration

The complete flowmeter consists of the sensor (SITRANS FCS200) and a transmitter SITRANS F C MASS 6000 or SIFLOW FC070. All communication options are available for MASS 6000.

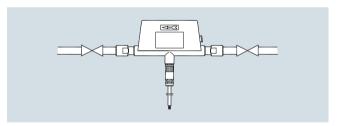
The sensor is shipped with a SENSORPROM memory unit containing all information about calibration data, device identity and factory pre-programming of transmitter settings.

#### Installation guidelines

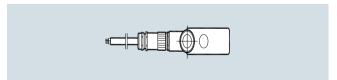
Siemens Flow Instruments recommends installing the sensor in one of the following ways:



Vertical orientation with an upwards flow



Horizontal installation, tubes up



Horizontal installation, tubes sideways

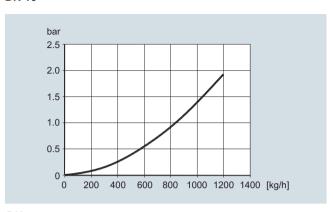
## SITRANS F C

## Flow sensor SITRANS FCS200

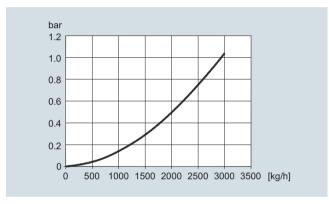
Sensor size	DN 10	DN 15	DN 25
Mass Flow			
Accuracy [% of rate]		± 0.5	
Repeatability [% of rate]		± 0.25	
Max. zero point error [kg/h (lb/h)]	0.25 (0.55)	1.2 (2.65)	3.0 (6.6)
Measuring range [kg/min (lb/min)]	0 42 (0 92.6)	0 200 (0 440.9)	0 500 (0 1102.3
Process temperature	-40 +	125 °C (-40	+257 °F)
Ambient temperature	-40 +	-60 °C (-40	+140 °F)
Temperature error		0.5 °C (0.9 °F	)
Pressure [bar (psi)]	350 (5076)	350 (5076)	214 (3104)
Enclosure grade	IP6	6/IP67 (EN 60	529)
Material			
Measuring pipe	Hastelloy C22/2.4602	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571
Splitter	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571	Stainless steel AISI 316L/1.4571
Enclosure and connection (flanges)		Stainless stee	·I
Connection thread	1/4" NPT 1/2" NPT 1/2" VCO	1/2" NPT 3/4" NPT 1" NPT 3/4" VCO	1" NPT 1½" NPT 1" VCO
Ex approval			
• ATEX	II 1/2 G Ex ia IIC T5/T4 Ga/Gb		
• IECEx	Ex	ia IIC T5/T4 Ga	a/Gb
• FM	Class I, Div 1, Groups A, B, C and D		
Weight approx.	2.8 kg (6.2 lb)	6.0 kg (13.2 lb)	11 kg (24.2 lb)
Approvals Custody transfer			
DN 10/DN 15	PTB Germany approval nr: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles		

## Characteristic curves

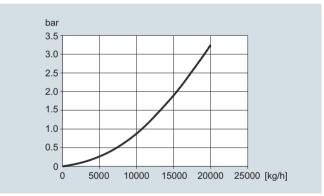
## DN 10



DN 15

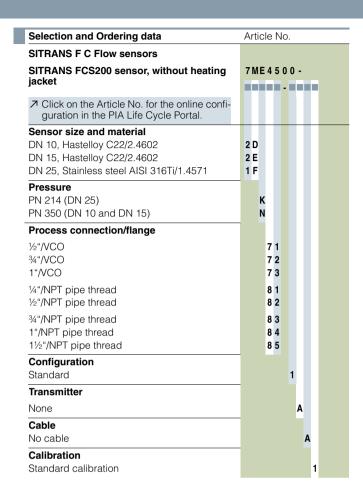


DN 25



The pressure drop as a function of capacity for CNG with a pressure of 200 bar (2900 psi) and an ambient temperature of 20  $^{\circ}\text{C}$  (68  $^{\circ}\text{F}).$ 

## Flow sensor SITRANS FCS200



Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	C11
Material certificate EN 10204-3.1	C12
NDT-Penetrant inspection report ISO 3452	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Tag name plate, stainless steel	Y17

## Accessories

Description		Article No.
Cable with multiple plug	5 m (16.4 ft)	FDK:083H3015
Standard blue cable between SIFLOW FC070/MASS 6000 and FCS200, $5\times2\times0.34~\text{mm}^2$ twisted and screened in pairs. Temperature range -20 °C +110 °C (-4 °F +230 °F)	10 m (32.8 ft)	FDK:083H3016
	25 m (82 ft)	FDK:083H3017
	50 m (164 ft)	FDK:083H3018
	75 m (246 ft)	FDK:083H3054
	150 m (492 ft)	FDK:083H3055

## Operating instructions for SITRANS FCS200

Description	Article No.
• English	A5E02508199
German	A5E03082574
Spanish	A5E03082587
• French	A5E03082581
• Italian	A5E03504933

#### Spare parts

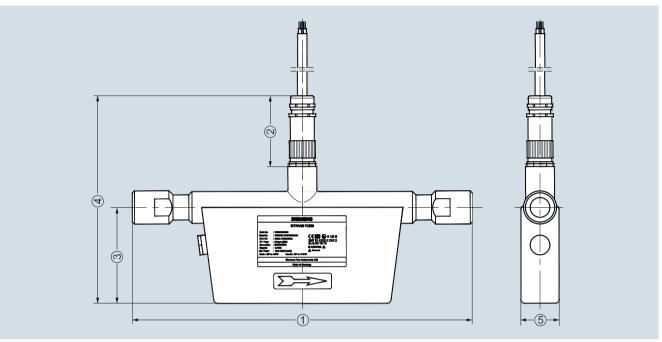
Description	Article No.
Multiple plug for cable mounting	FDK:083H5056
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410

SITRANS F C

# Flow sensor SITRANS FCS200

# Dimensional drawings

## SITRANS FCS200, DN 10 ... DN 15

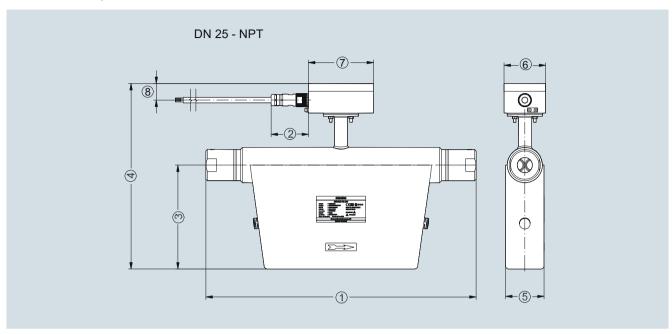


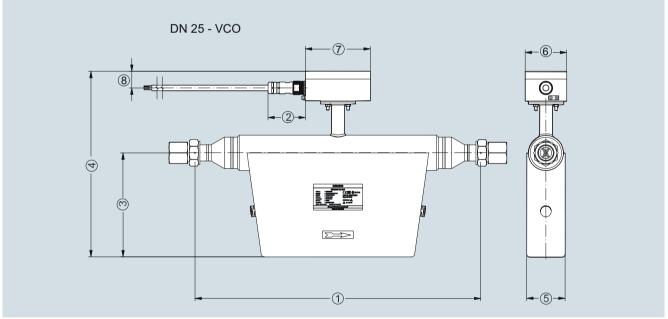
SITRANS FCS200, DN 10 ... DN 15, dimensions in mm (inch)

Position	DN 10 with NPT connectors mm (inch)	DN 10 with VCO connectors mm (inch)	DN 15 mm (inch)
(1)	350 (13.78)	330 (12.99)	450 (17.72)
(2)	72 (2.84)	72 (2.84)	72 (2.84)
(3)	100 (3.94)	100 (3.94)	148 (5.83)
(4)	204 (8.03)	204 (8.03)	253 (9.96)
(5)	40 (1.57)	40 (1.57)	48 (1.89)

Flow sensor SITRANS FCS200

## SITRANS FCS200, DN 25





SITRANS FCS200, DN 25, dimensions in mm (inch)

Position	DN 25 with NPT connection	DN 25 with VCO connection
	mm (inch)	mm (inch)
(1)	520 (20.47)	550 (21.65)
(2)	72 (2.84)	72 (2.84)
(3)	200 (7.87)	200 (7.87)
(4)	357 (14.77)	357 (14.77)
(5)	74 (2.91)	74 (2.91)
(6)	80 (3.15)	80 (3.15)
(7)	125 (4.92)	125 (4.92)
(8)	32 (1.26)	32 (1.26)

SITRANS F.C.

#### Flow sensor MASS 2100 DI 1.5

#### Overview



MASS 2100 DI 1.5 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

#### Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1, from 30 kg/h to a few g/h
- Densitometer performance available through a density accuracy better than 0.001 g/cm<sup>3</sup> with a repeatability better than 0.0002 g/cm<sup>3</sup>.
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications.
- Market's biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex ia design as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/ 1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Dual-drive pick-up and driver construction facilitate ultra lowweight pipe construction giving the markets' smallest and most stable zero point.
- Rugged and space-saving sensor design in stainless steel matching all environments
- · High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

## Application

In many industries such as the food and beverage or pharam-ceutical industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superiour performance in numerous applications and field trails relating to accuracy and turn-down ratio. It is today the preferred meter for research and development and mini-plant applications for liquid or gas measurement, where measuring small quantities is important.

The main applications for the MASS 2100 DI 1.5 sensor can be found in:		
Chemical industry	Liquid and gas measurement within Miniplant and R & D, dosing of additives and catalysts	
Cosmetic industry	Dosing of essence and fragrances	
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors	
Food and beverage industry	Dosing of flavourings, colours and additives, density measurement, inline measurement of liquid or gaseous CO <sub>2</sub>	
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds	

#### Design

The MASS 2100 sensor consists of a single bent tube in a double omega pipe configuration, welded directly to the process connectors at each end.

The sensor is available in 2 material configurations, AISI 316L/ 1.4404 or Hastelloy C22/2.4602 with 1/4" NPT or 1/4" ISO process connections

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP65/NEMA 4.

The sensor is available in either a standard version with a maximum liquid temperature of 125 °C (257 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The enclosed single quick release clamp fitting which, along with its compact design and single multi-plug electrical connector, will keep installation costs and time to a minimum as shown below.



#### Flow sensor MASS 2100 DI 1.5

## Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

#### Integration

The sensor can be connected to all MASS 6000 transmitters for remote installation only.

All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

## Installation guidelines MASS 2100 DI 1.5 (1/16")

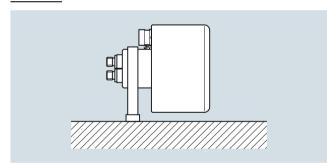
#### Installation of MASS 2100 sensor

- The optimal installation is horizontal.
  - If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.

If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).

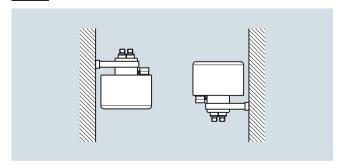
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

#### Horizontal



Liquid and gas application

#### Vertical



Liquid application (left), gas application (right)

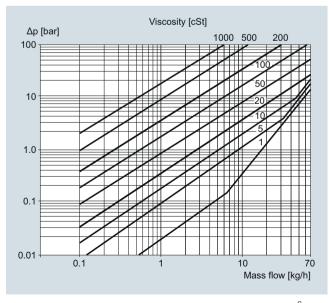
Technical specifications	
1 11 1 1 1	

<b>Inside pipe diameter</b> (sensor consists of one continuous pipe)	1.5 mm (0.06")					
Pipe wall thickness	0.25 mm (0.010")					
Mass flow measuring range	0 30 kg/h (0 66 lb/h)					
Density	0 2.9 g/cm <sup>3</sup> (0 0.10 lb/inch <sup>3</sup> )					
Fraction e.g.	0 100 °Brix					
Temperature						
Standard	-50 +125 °C (-58 +257 °F)					
High-temperature version	-50 +180 °C (-58 +356 °F)					
Liquid pressure measuring pipe <sup>1)</sup>						
Stainless steel	230 bar (3336 psi) at 20 °C (68 °F)					
Hastelloy C22/2.4602	365 bar (5294 psi) at 20 °C (68 °F)					
Materials						
Measuring pipe and connection	Stainless steel AISI 316L/1.4435					
	Hastelloy C22/2.4602					
Enclosure and enclosure material <sup>2)</sup>	IP65 and stainless steel AISI316L/1.4404					
Connection thread						
ISO 228/1	G1/4" male					
ANSI/ASME B1.20.1	1/4" NPT male					
Cable connection	Multiple plug connection to sensor $5 \times 2 \times 0.35 \text{ mm}^2$ twisted and screened in pairs, ext. $\emptyset$ 12 mm					
Ex-version	II 1G Eex ia IIC T3-T6, DEMKO 03 ATEX 135252X c-UL-us Ex ia IIC T3-T6 UL WYMG.E232147					
Weight approx.	2.6 kg (5.73 lb)					

<sup>1)</sup> According to DIN 2413, DIN 17457

For accuracy specifications see "System information SITRANS F C".

#### Pressure drop



MASS 2100 DI 1.5 (1/16"), pressure drop for density =  $1000 \text{ kg/m}^3$ 

<sup>2)</sup> Housing is not rated for pressure containment.

## SITRANS F C

## Flow sensor MASS 2100 DI 1.5

Flow Selisor WASS 2100 Dr 1.5							
Selection and Ordering data	Art	icle	e N	Ο.	C	ord.	code
SITRANS F C Flow sensors	7 M	E 4	4 1	0 0	-		
MASS 2100 DI 1.5 (1/16") sensor				-			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Diameter							
Stainless steel AISI 316L/1.4435 DI 1.5, max. 125 °C (257 °F) DI 1.5, max. 180 °C (356 °F)	1 A 1 B						
Hastelloy C22/2.4602 DI 1.5, max. 125 °C (257 °F) DI 1.5, max. 180 °C (356 °F)	2 A 2 B						
Pressure							
PN 100 PN 230 (AISI 316L/1.4404) PN 365 (C22/2.4602)		D L P					
Process connection/flange							
Pipe thread G ¼" male ¼" NPT male			1 0 1 1				
Configuration							
Standard Density Brix/Plato				1 2 3			
Fraction (specification required)				9			N 0 Y
Transmitter compact mounted on sensor							
No transmitter, sensor and adapter only					A		
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Exapproval.					В		
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC.					С		
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz					D		
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC					Ε		
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT					F		
Cable No cable						A	
5 m (16.4 ft) cable 10 m (32.8 ft) cable						B C	
25 m (82 ft) cable 50 m (164 ft) cable						D E F	
75 m (246 ft) cable						r G	
150 m (492 ft) cable  Calibration						u	
Standard calibration 3 flow x 2 points Standard calibration matched pair 3 flow x						1 2	
2 points Accredited calibration matched pair 5 flow x						3	
2 points (DANAK)  Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional						8	
information)							

Selection and Ordering data	Order code
	01401 0040
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	C11
Material certificate EN 10204-3.1	C12
Welding certificate NDT-Penetrant: ISO 3452	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Tag name plate, stainless steel	Y17
Tag name plate, plastic	Y18
Customer-specific transmitter setup	Y20
Customer-specified, matched pair (5 x 2)	Y60
Customer-specified calibration (5 x 2)	Y61
Customer-specified, matched pair (10 x 1)	Y62
Customer-specified calibration (10 x 1)	Y63
Cleaned for oil and grease	Y80
Special version	Y99

## Operating instructions for SITRANS F C MASS 2100 DI 1.5

Description	Article No.
• English	A5E03089952

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\dot{\rm F}$  literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm <sup>2</sup> twisted and screened in pairs. Temperature range -20 °C +110 °C (-4 °F +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:083H3054	
• 150 m (492 ft)	FDK:083H3055	

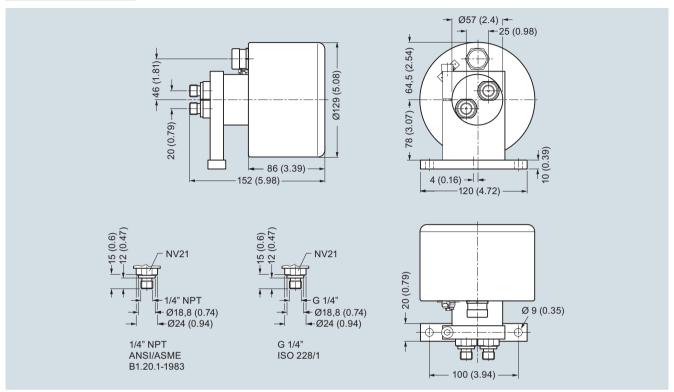
## Spare parts

Description	Article No.	
Multiple plug for cable mounting	FDK:083H5056	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410	
Bracket	A5E02590427	

3/210

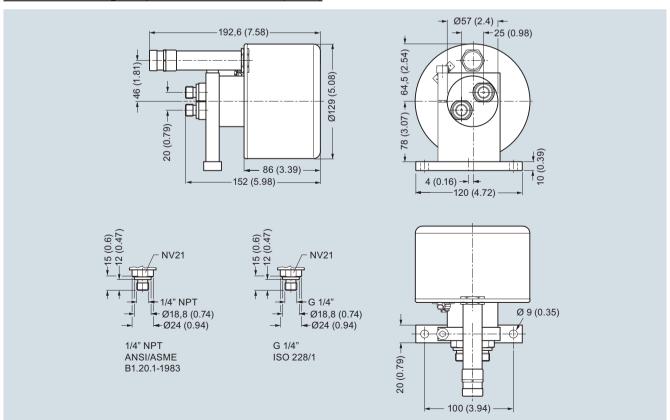
# Dimensional drawings

## MASS 2100 DI 1.5 (1/16")



Dimensions in mm (inch)

## MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



Dimensions in mm (inch)

SITRANS F C

#### Flow sensor SITRANS FC300

#### Overview



SITRANS FC300 is a compact Coriolis mass sensor suitable for flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" interface ensures optimum performance and operation.

A new designed encapsulation in stainless steel with a surprisingly low weight of only 3.5 kg (7.7 lb), ensures a rigid and robust sensor performance for a wide range of applications.

#### Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through a density accuracy as follows:
  - For 316L/1.4404 version better than 0.0015 g/cm<sup>3</sup> (0.000036 lb/inch<sup>3</sup>) with repeatability better than 0.0002 g/cm<sup>3</sup> (0.0000072 lb/inch<sup>3</sup>)
  - For C22/2.4602 version better than 0.0025 g/cm<sup>3</sup> (0.000090 lb/inch<sup>3</sup>) with repeatability better than 0.001 g/cm<sup>3</sup> (0.000036 lb/inch<sup>3</sup>)
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Larger wall thickness, ensures optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enable true "plug & play". Installation and commissioning in less than 10 minutes.
- · Intrinsically safe Ex design ia IIC as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance.
- Rugged and space-saving sensor design in stainless steel matching all applications.

- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement

## Application

The industry today has an increasing demand for mass flowmeters with a reduced physical size without loss of performance. The meters must be suitable for installation in traditional process industry environment as well as OEM equipment for instance within automotive or appliance industry. Independent of industry application the meter must deliver accurate and reliable measurements. The new and versatile design of the FC300 offers this flexibility.

Linuid and man management in
Liquid and gas measurement in normal as well as corrosive envi- ronments
Dosing of essence and fra- grances
High-speed dosing and coating of pills, filling of ampuls/injectors
Filling, dosing of flavorings, colors and additives, inline density measurement
Measurement and dosing of liquid or gaseous CO <sub>2</sub>
Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

#### Design

The FC300 sensor consists of a single tube bent in double omega pipe geometry, welded directly to the process connectors at each end. The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with  $\frac{1}{4}$ "-NPT or G $\frac{1}{4}$ "-ISO process connections.

The enclosure is made of stainless steel AISI 316L/1.4409 with a grade of encapsulation of IP67/NEMA 4. The enclosure has a very robust design and with an overall size of  $130 \times 200 \times 60$  mm (5.12" x 7.87" x 2.36") the sensor is very compact and requires only little installation space.

The sensor can be delivered in a standard version with a maximum liquid temperature of 115 °C (239 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The sensor can be mounted directly on any given plane surface or if desired with the enclosed quick release clamp fitting which, along with its compact design and multi-plug electrical connector, will keep installation costs and time to a minimum.

## Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

#### Integration

The sensor can be connected to all MASS 6000 and SIFLOW FC070 (standard and Ex types) transmitters for remote installation only.

All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

## Flow sensor SITRANS FC300

#### Installation guidelines for SITRANS FC300 sensor

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

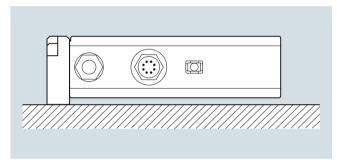
Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.

For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

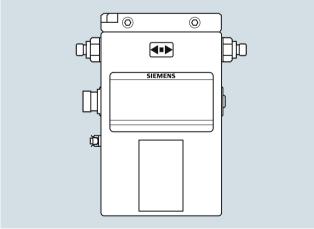
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free and plane wall or steel frame.
- Locate the sensor low in the system in order to avoid underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

#### Horizontal mounting (recommended) (fig. A)



Liquid or gas (low to high flow)

## Vertical mounting (fig. B)



Liquid or gas (medium to high flow)

## Technical specifications

reclinical specifications				
Sensor size	DN 4 (1/6")			
Mass flow				
Measuring range	0 350 kg/h (0 772 lb/h)			
Accuracy, mass flow	0.1 % of rate			
Repeatability	0.05 % of rate			
Max. zero point error	0.010 kg/h (0.022 lb/h)			
Density				
Density range	0 2.9 g/cm <sup>3</sup> (0 0.105 lb/inch <sup>3</sup> )			
Density error				
• Stainless steel	0.007 g/cm <sup>3</sup> (0.00025 lb/inch <sup>3</sup> )			
Hastelloy C22/2.4602	0.0025 g/cm <sup>3</sup> (0.00009 lb/inch <sup>3</sup> )			
Repeatability error	0.0002 g/cm <sup>3</sup> (0.0000072 lb/inch <sup>3</sup> )			
Temperature				
Standard	-40 +115 °C (-40 +239 °F)			
High-temperature version	-40 +180 °C (-40 +356 °F)			
Temperature error	0.5 °C (0.9 °F)			
Brix				
Measuring range	0 100 °Brix			
Brix error	0.3 °Brix			
Inside pipe diameter				
Stainless steel version	3.5 mm (0.14")			
Hastelloy version	3.0 mm (0.12")			
Pipe wall thickness				
Stainless steel version	0.25 mm (0.0098")			
Hastelloy version	0.5 mm (0.0196")			
Liquid pressure measuring pipe <sup>1)</sup>				
Stainless steel	130 bar (1885 psi) at 20 °C (68 °F)			
Hastelloy C22/2.4602	410 bar (5945 psi) at 20 °C (68 °F)			
Materials	Stainless steel AISI 316L/1.4435			
Measuring pipe and connection	Hastelloy C22/2.4602			
Enclosure <sup>2)</sup>				
Material	Stainless steel AISI 316L/1.4404			
Enclosure grade	IP67/NEMA4			
Connection thread				
ISO 228/1	G1/4" male			
ANSI/ASME B1.20.1	1/4" NPT male			
Ex approval	Ex ia IIC T3-T6			
	05ATEX138072X			
	c-UL-us Class 1 Div. 1, Gr. A, B, C, D			
Weight	3.5 kg (7.7 lb)			
Dimensions	135 x 205 x 58 mm			
	(5.31" x 8.07" x 2.28")			

<sup>1)</sup> According to DIN 2413, DIN 17457

<sup>&</sup>lt;sup>2)</sup> Housing is not rated for pressure containment.

SITRANS F C

## Flow sensor SITRANS FC300

Selection and Ordering data	Art	icl	е	No	).	Oı	rde	r code
SITRANS F C Flow sensors	7 N	ΙE	4	4 0	0	•		
SITRANS FC300 DN 4 (1/6") sensor	į.		Ī					
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
Pipe material and temperature								
Stainless steel AISI 316L/1.4435 115 °C (239 °F)	10							
180 °C (356 °F)	1 F							
Hastelloy C22/2.4602								
115 °C (239 °F) 180 °C (356 °F)	2 G							
Pressure	21							
PN 100		D						
PN 130 (316L/C22)		G						
PN 410 (C22)		Q						
Process connection Pipe thread								
G 1/4" male			1					
½" NPT male  Configuration			1	1				
Standard					1			
Density					2			
Brix/Plato Fraction (specification required)					3			NOY
Transmitter compact mounted on sensor					3			14 0 1
No transmitter, sensor and adapter only						Α		
MASS 6000, Ex d, stainless steel enclosure,						В		
1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Ex- approval								
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC						С		
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz						D		
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC						E		
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT						F		
Cable								
No cable 5 m (16.4 ft) cable							A B	
10 m (32.8 ft) cable							C	
25 m (82 ft) cable						ı	D	
50 m (164 ft) cable							E	
75 m (246 ft) cable							F G	
150 m (492 ft) cable  Calibration						,	J	
Standard calibration 3 flow x 2 points Standard calibration matched pair 3 flow x 2 points							1 2	
Accredited calibration matched pair 5 flow x 2 points (DANAK)							3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)							8	

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	C11
Material certificate EN 10204-3.1	C12
Welding certificate NDT-Penetrant: ISO 3452	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Tag name plate, stainless steel	Y17
Tag name plate, plastic	Y18
Customer-specific transmitter setup	Y20
Customer-specified, matched pair (5 x 2)	Y60
Customer-specified calibration (5 x 2)	Y61
Customer-specified, matched pair (10 x 1)	Y62
Customer-specified calibration (10 x 1)	Y63
Cleaned for oil and grease	Y80
Special version	Y99

## Operating instructions for SITRANS F C FC300

Description	Article No.
• English	A5E00698213
German	A5E00728101
<ul> <li>Spanish</li> </ul>	A5E00746629
• French	A5E00746625

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

## Accessories

Description	Article No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 × 2 × 0.34 mm² twisted and screened in pairs. Temperature range -20 °C +110 °C (-4 °F +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:083H3054	
• 150 m (492 ft)	FDK:083H3055	

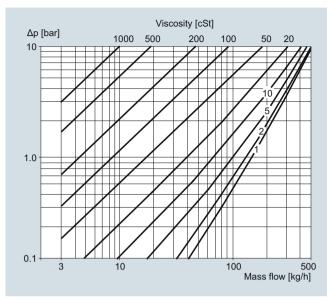
#### Spare parts

Spare parts		
Description	Article No.	
Multiple plug for cable mounting	FDK:083H5056	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410	Ç.
Mounting bracket in AISI 304	A5E02590439	
Demo suitcase including MASS 6000, FC300 (DN 4), and HART module	A5E00789737	

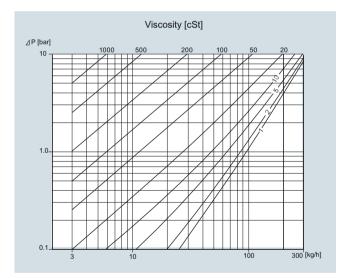
Flow sensor SITRANS FC300

# Characteristic curves

## Pressure drop



Stainless steel 316L/1.4404



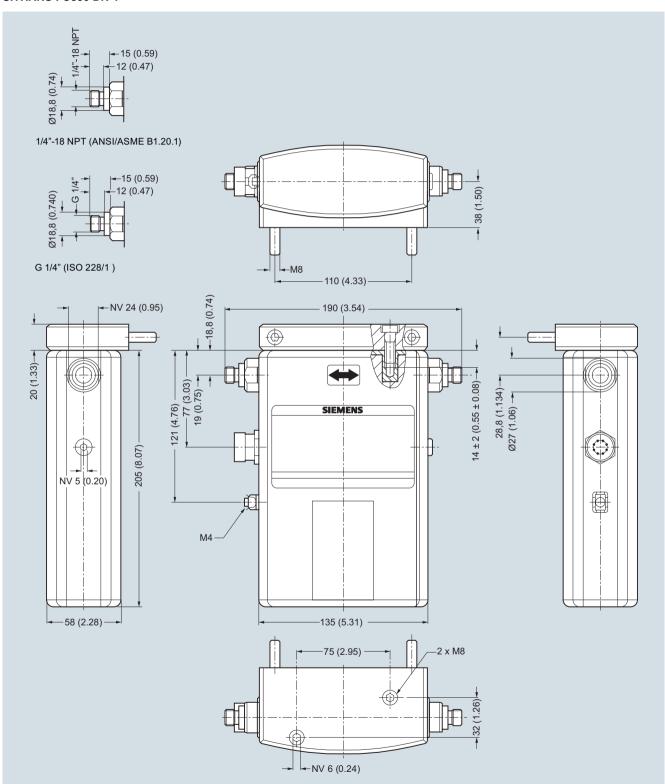
Hastelloy C22/2.4602

SITRANS F C

## Flow sensor SITRANS FC300

## Dimensional drawings

## SITRANS FC300 DN 4



SITRANS FC300, dimensions in mm (inch)

#### Flow sensor MASS 2100 DI 3 to DI 40

#### Overview



MASS 2100 DI 3 to DI 40 is suitable for accurate mass flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

#### Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm<sup>3</sup> with a typical repeatability better than 0.0001 to 0.0002 g/cm<sup>3</sup>
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets' thickest sensor walls ensure optimal life-time and corrosion resistance and high-pressure durability
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density changes etc.)
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex design ia IIC as standard, making service in hazardous area possible without having to demount the sensor if a compact Ex d transmitter needs service
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement
- Uniform sensor interface matching all transmitter versions at the same time whether it is compact IP67/NEMA 6, compact Ex d or remote installation, one sensor fits all

## Application

Coriolis mass flowmeters are suitable for measuring all liquids and gases. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turndown ratio which is a paramount in many applications.

The main applications of the Coriolis flowmeter can be found in all industries, such as:								
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis							
Food and beverage	Dairy products, beer, wine, soft-drinks, Brix/Plato, fruit juices and pulps, bottling, CO <sub>2</sub> dosing, CIP-liquids							
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots							
Oil and gas	Filling of gas bottles, furnace control, test separators, LPG							
Water and waste water	Dosing of chemicals for water treatment							

The wide varity of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

## Design

The MASS 2100 sensor consists of a single bent tube in a double bent pipe configuration, welded directly to the process connectors at each end.

The centre-block is brazed onto the sensor pipes from the outside acting as a mechanical low pass filter.

The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The sensor is as standard Ex ia approved, intrinsically safe.

The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.

**Heating:** All the sensors MASS 2100, DI 3 to DI 40, can optionally be equipped with a heating coil to avoid solidification of sensitive fluids during down-time or period between discontinuing processes. This feature gives the user an alternative to the costly electrical heating normally used, as it gives the freedom to choose either hot water, superheated steam or hot oil, to maintain a constant temperature inside the sensor.

SITRANS F.C.

#### Flow sensor MASS 2100 DI 3 to DI 40

#### Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

#### Integration

The sensor can be connected to all MASS 6000 transmitters for compact and remote installation as well as SIFLOW FC070 standard and Ex type transmitters.

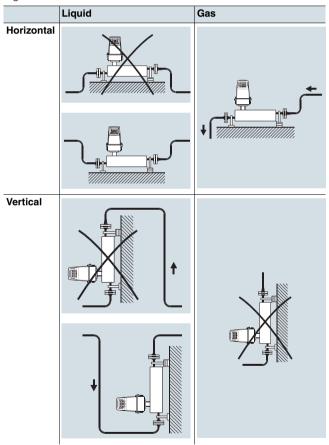
All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

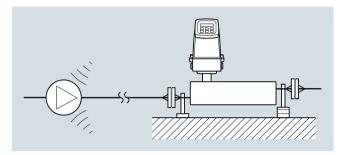
## Installation guidelines MASS 2100 DI 3 ... DI 40 (1/8" ... 11/2")

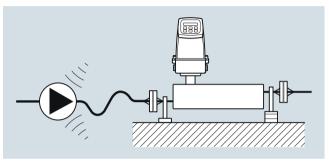
#### Installation of sensor

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

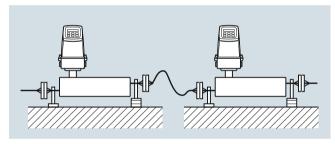






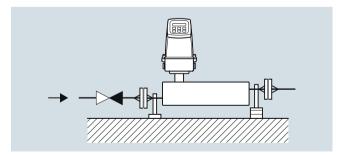
#### Vibration

Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping.



#### Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.



#### Zero point adjustment

To facilitiate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuarcy.

# Flow sensor MASS 2100 DI 3 to DI 40

## Technical specifications

Versions (mm (inch))		DI 3 (1/8)	DI 6 (1/4)	DI 15 (5/8)	DI 25 (1)	DI 40 (1½)	
Inside pipe diameter (sensor consists of one continuous pipe)	mm (inch)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)	29.7 (1.17)	43.1 (1.70)	
Pipe wall thickness	mm (inch)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)	2.0 (0.08)	2.6 (0.10)	
Mass flow measuring range	kg/h (lb/h)	0 250 (0 550)	0 1000 (0 2200)	0 5600 (0 12345)	0 25000 (0 55100)	0 52000 (0 114600)	
Density	g/cm <sup>3</sup> (lb/inch <sup>3</sup> )			0 2.9 (0 0.	10)		
Fraction e.g.	°Brix	С	70 (applicable	temperature range: 1	0 99 °C (50 210	.2 °F))	
Temperature							
Standard	°C (°F)		-[	50 +180 °C (-58	+356 °F)		
Liquid pressure measur- ing pipe <sup>1)</sup>							
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)	110 (1595)	105 (1523)	
Hastelloy C22/2.4602	bar (psi)	350 (5076)	410 (5946)	200 (2900)	185 (2683)	not available	
Materials							
Measuring pipe, flange and thread connection		Hastollov	St C22/2.4602	tainless steel AISI 31	6L/1.4435 not available		
Enclosure and enclosure		паѕієпоу		4) and stainless ste			
material				g is not rated for pre			
Process connections <sup>2)</sup>							
Flange							
EN 1092-1, PN 40			DN 10	DN 15	DN 25	DN 40	
ANSI B16.5, Class 150			1/2"	1/2"	1"	11/2"	
ANSI B16.5, Class 600 (Class 300)			1/2"	1/2"	1"	11/2"	
Dairy screwed connection (PN 16/25/40) <sup>3)</sup>							
DIN 11851			DN 10	DN 15	DN 32	DN 40	
ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm	38 mm	51 mm	
Dairy clamp connection (PN 16) <sup>3)</sup>							
ISO 2852/BS 4825 part 3 (SMS3016)			25 mm	25 mm	38 mm	51 mm	
Thread							
ISO 228/1, PN 100		G1/4" female	G1/4" male	G½" male	G1" male	G2" male	
ANSI/ASME B1.20.1, PN 100		1/4" NPT female	1/4" NPT male	½" NPT male	1" NPT male	2" NPT male	
Cable connection		Multiple plug co	onnection to sensor	r 5 x 2 x 0.35 mm <sup>2</sup> tw	isted and screened in	pairs, ext. Ø 12 m	
Ex-version		Ex ia IIC T3-T6, DEMKO 03 ATEX 135252X					
Weight approx.	kg (lb)	4 (8.8)	8 (17.6)	12 (26.5)	48 (105.8)	70 (154.5)	

<sup>1)</sup> Max. at 20 °C (68 °F), DIN 2413, DIN 17457

For accuracy specification see "System information SITRANS F C".

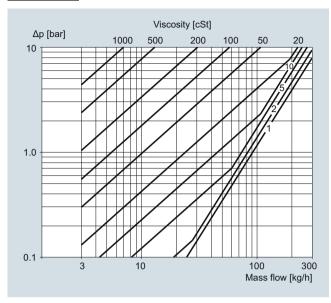
 $<sup>^{2)}\,</sup>$  Other connections to order, see "Selection and Ordering data"

<sup>3)</sup> Material, AISI 316/1.4401 or corresponding

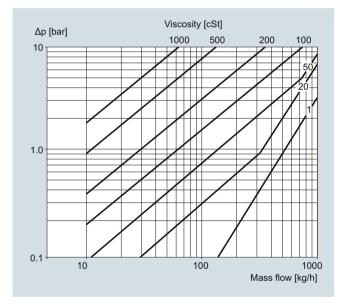
## SITRANS F C

## Flow sensor MASS 2100 DI 3 to DI 40

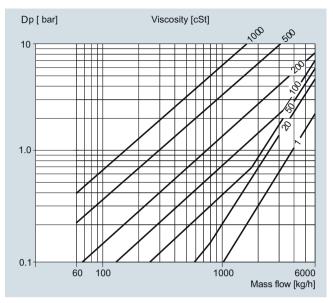
## Pressure drop



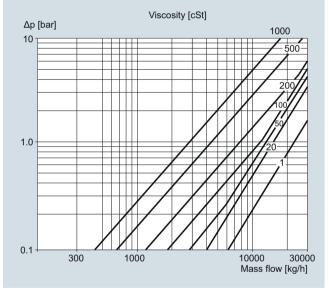
MASS 2100 DI 3 (1/8"), pressure drop for density =  $1000 \text{ kg/m}^3$ 



MASS 2100 DI 6 ( $\frac{1}{4}$ "), pressure drop for density = 1000 kg/m<sup>3</sup>

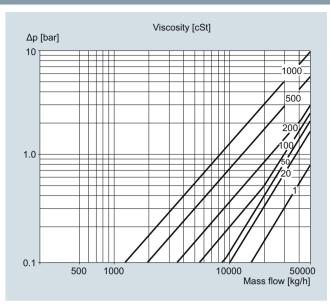


MASS 2100 DI 15 ( $\frac{1}{2}$ "), pressure drop for density = 1000 kg/m<sup>3</sup>



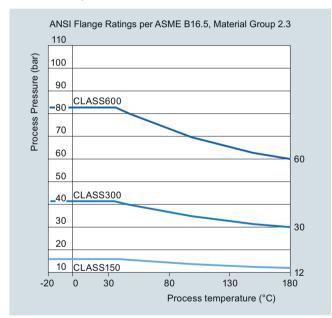
MASS 2100 DI 25 (1"), pressure drop for density =  $1000 \text{ kg/m}^3$ 

## Flow sensor MASS 2100 DI 3 to DI 40

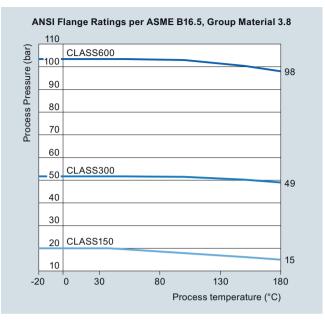


MASS 2100 DI 40 (1½"), pressure drop for density =  $1000 \text{ kg/m}^3$ 

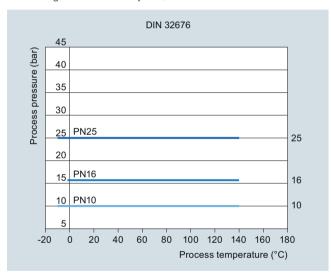
#### Pressure/temperature curves



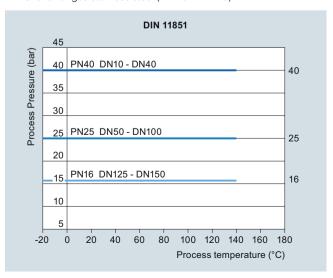
ASME flanges B16.5 stainless steel



ASME flanges B16.5 Hastelloy C22/2.4602



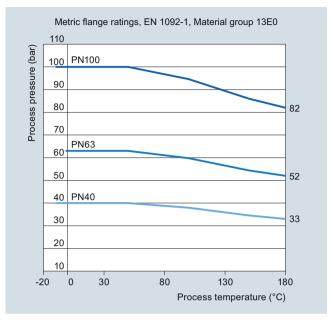
DIN 32676 flanges stainless steel (PN 10 ... PN 25)



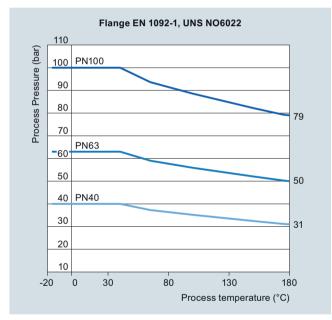
DIN 11581 flanges stainless steel (PN 25 ... PN 40)

## SITRANS F.C.

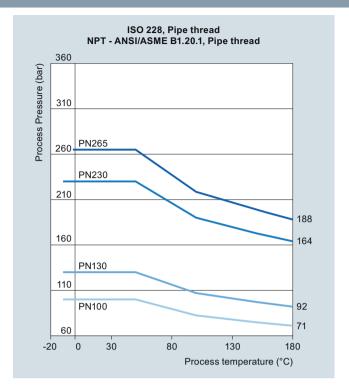
## Flow sensor MASS 2100 DI 3 to DI 40



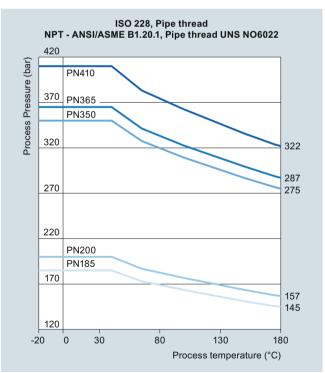
EN 1092 flanges stainless steel (PN 40 ... PN 100)



EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)



ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410) For further information on the PED standard and requirements, see page 9/6.

# Flow sensor MASS 2100 DI 3 to DI 40

Selection and Ordering data	Article No. Ord. code	Selection and Ordering data	Article No.	Ord.	code
SITRANS F C sensors	7.11.10.10.110.1	SITRANS F C sensors	7 11 11 11 11 11 11	0.4.	
MASS 2100 without heating jacket	7ME4100-	MASS 2100 without heating jacket	7ME410	0 -	
MASS 2100 heated, DN 15 connection	7ME4200-	MASS 2100 heated, DN 15 connection	7ME 4 2 0 0 - 7ME 4 2 1 0 -		
MASS 2100 heated, ½ inch, ANSI B16.5	7ME4210-	MASS 2100 heated, ½ inch, ANSI B16.5			
connection		connection			
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		Dairy screwed connection DIN 11851			
Diameter		DN 10 (PN 40) DN 15 (PN 40)	4 0 4 1		
Stainless steel AISI 316L/1.4435		DN 25 (PN 40)	4 2		
DI 3 (PN 100/PN 230)	1 C	DN 32 (PN 40)	4 3		
DI 6	1 D	DN 40 (PN 25)	4 4		
DI 15	1 E	DN 50 (PN 25)	4 5		
DI 25 DI 40	1 F 1 G	DN 65 (PN 25)	4 6		
Hastelloy C22/2.4602 DI 3 (PN 100/PN 350)	2 C	<b>Dairy clamp connection ISO 2852 (DIN 32676)</b> Cone down the sensor in order to obtain self-drainage with connectors ISO 2852			
DI 6	2 D	25 mm (PN 16)	5 0		
Pressure		38 mm (PN 16)	5 1		
PN 16 (DI 6, DI 15, DI 25 and DI 40)	A	51 mm (PN 16)  Dairy screwed connection ISO 2853	5 2		
PN 25 (DI 6, DI 15, DI 25 and DI 40) PN 40 (DI 6, DI 15, DI 25 and DI 40)	B	•			
PN 100 (DI 3, DI 6, DI 15, DI 25 and DI 40)	D	25 mm (PN 16) 38 mm (PN 16)	6 0 6 1		
PN 105 (DI 40, 2", AISI 316L/1.4404)	E	51 mm (PN 16)	6 2		
PN 110 (DI 25, 1", AISI 316L/1.4404)	F	Configuration/calibration type			
PN 130 (DI 15, 1/2", AISI 316L/1.4404)	G	Standard		1	
PN 185 (DI 25, 1", Hastelloy C22/2.4602)	J	Density		2	
PN 200 (DI 15, ½", Hastelloy C22/2.4602)	K	Brix/Plato		3	
PN 230 (DI 3, ¼", AISI 316L/1.4404) PN 265 (DI 6, ¼", AISI 316L/1.4404)	L M	Fraction (specification required)		9	N O Y
PN 350 (DI 3, 1/4", Hastelloy C22/2.4602)	N	Transmitter compact mounted on sensor			
PN 410 (DI 6, 1/4", Hastelloy C22/2.4602)	Q	No transmitter, sensor and adapter only		A	
Class 150 (DI 6, DI 15, DI 25 and DI 40) Class 600 (DI 6, DI 15, DI 25 and DI 40)	R S	MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Ex-		В	
Process connection/flange		approval			
Pipe thread G 1/4"	1 0	MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC		С	
1/4" NPT	11	MASS 6000, IP67, Polyamide enclosure,		D	
G ½"	1 2	cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz			
½" NPT G 1	1 3 1 4	MASS 6000, IP67, Polyamide enclosure,		E	
1" NPT	1 5	cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC			
G 2"	1 6	MASS 6000, IP67, Polyamide enclosure, cable		F	
2" NPT	1 7	glands 1/2" NPT, 1 current, 1 freq./pulse and 1			
Flange EN1092-1 Form B		relay output, 115/230 V AC 50/60 Hz			
DN 10 (PN 40/PN 100)	2 0	Cable No cable		A	
DN 15 (PN 40/PN 100) DN 25 (PN 40/PN 100)	2 1 2 2	5 m (16.4 ft) cable		В	
DN 40 (PN 40/PN 100)	2 3	10 m (32.8 ft) cable		С	
DN 50 (PN 40/PN 100)	2 4	25 m (82 ft) cable		D	
Flange ASME/ANSI B 16.5		50 m (164 ft) cable 75 m (246 ft) cable		E	
½" (class 150/class 600)	3 0	150 m (492 ft) cable		G	
3/4" (class 150/class 600)	3 1	Calibration/verification		G	
1" (class 150/class 600)	3 2			1	
1 ½" (class 150/class 600) 2" (class 150/class 600)	3 3 3 4	Standard calibration 3 flow x 2 points Stand. calibration matched pair 3 flow x 2 points		2	
,,,,		Accredited calibration matched pair 5 flow x		3	
		2 points (DANAK to ISO 17025)			

Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)

## SITRANS F C

## Flow sensor MASS 2100 DI 3 to DI 40

# Dairy MLFB example MASS 2100 Sensor size DI 15, AISI 316L/1.4435 PN 40 DN 15 connector Standard configuration/calibration MASS 6000 IP67 compact mounted No cable Standard calibration, 3 flow x 2 points 1 C A A

Selection and Ordering data	Order code
Addtional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	C11
Material certificate EN 10204-3.1	C12
NDT- X-ray inspection report: EN 1435 DI3 sensor only: NDT-Penetrant inspection report ISO 3452.	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Tag name plate, stainless steel	Y17
Tag name plate, plastic	Y18
Customer-specific transmitter setup	Y20
Customer-specified, matched pair (5 x 2)	Y60
Customer-specified calibration (5 x 2)	Y61
Customer-specified, matched pair (10 x 1)	Y62
Customer-specified calibration (10 x 1)	Y63
Cleaned for oil and grease	Y80
Special version	Y99

# Operating instructions for SITRANS F C MASS 2100 DI 3 to DI 40

Description	Article No.	
• English	A5E02896535	
<ul> <li>German</li> </ul>	A5E03073519	
<ul><li>Spanish</li></ul>	A5E03073549	
• French	A5E03073539	

This device is shipped with a Quick Start guide and a CD containing further SITRANS  $\dot{\rm F}$  literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

# Selection and Ordering data Accessories

Description	Dimension	Article No.
Mating parts for hygienic fittings	DN 10	FDK:085U1016
DIN 11851	DN 15	FDK:085U1017
cludes: 2 unions 2 mating parts (for welding in) 2 EPDM gaskets  ating parts for hygienic clamp 0 2852 cludes: 2 clamps 2 mating parts 2 EPDM gaskets	DN 25	FDK:085U1019
• 2 mating parts (for welding in)	DN 32	FDK:085U1020
• 2 EPDIVI gaskets	DN 40	FDK:085U1021
	DN 50	FDK:085U1022
Mating parts for hygienic clamp	DN 65	FDK:085U1023
	25 mm	FDK:085U1029
ISO 2852	40 mm	FDK:085U1031
• 2 clamps	50 mm	FDK:085U1032
<ul><li>2 mating parts</li><li>2 EPDM gaskets</li></ul>		
2 EPDM gaskets with collar for	DN 10	FDK:085U1006
mounting set DIN 11851	DN 15	FDK:085U1007
	DN 25	FDK:085U1009
	DN 32	FDK:085U1010
	DN 40	FDK:085U1011
	DN 50	FDK:085U1012
	DN 65	FDK:085U1013

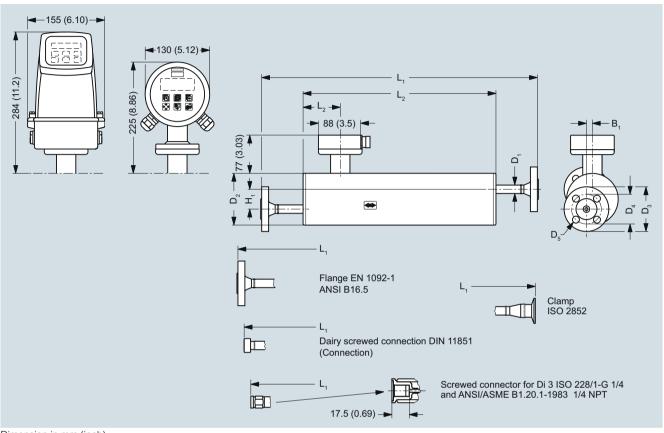
Description	Length	Article No.
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C +110 °C (-4 °F +230 °F)		
	5 m (16.4 ft)	FDK:083H3015
	10 m (32.8 ft)	FDK:083H3016
	25 m (82 ft)	FDK:083H3017
	50 m (164 ft)	FDK:083H3018
	75 m (246 ft)	FDK:083H3054
	150 m (492 ft)	FDK:083H3055

## Spare parts

Description	Article No.
Adapter for MASS 2100	FDK:083L8889
Multiple plug for cable mounting	FDK:083H5056
kB SENSORPROM unit, including programming (Sensor Serial No. and Article No. must be specified by ordering)	and a second
	FDK:083H4410

# Dimensional drawings

## MASS 2100 sensor



Dimension in mm (inch)

For not listed variants please contact product support

Sensor size	Connections			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm
DI (inch)	Туре	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G1/4	PN 100	1/4"	400	280	75.5	60	0	21.3	104	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - 1/4" NPT	PN 100	1/4"	400	280	75.5	60	0	21.3	104	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	580	390	62.0	40	12	17.0	104	100	70.0	14.0
(1/4)	Flange EN 1092-1	PN 40	DN 10	560	390	62.0	40	12	17.0	104	90.0	60.0	14.0
,	Flange ANSI B16.5	Class 150	1/2"	624	390	62.0	40	12	17.0	104	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	1/2"	608	390	62.0	40	12	17.0	104	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 10	532	390	62.0	40	12	17.0	104	-	-	-
	Clamp ISO 2852	PN 16	25 mm	570	390	62.0	40	12	17.0	104	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	634	444	75.5	44	20	21.3	129	105	75.0	14.0
(1/2)	Flange EN 1092-1	PN 40	DN 15	620	444	75.5	44	20	21.3	129	95.0	65.0	14.0
,	Flange ANSI B16.5	Class 150	1/2"	639	444	75.5	44	20	21.3	129	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	1/2"	660	444	75.5	44	20	21.3	129	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 15	586	444	75.5	44	20	21.3	129	-	-	-
	Clamp ISO 2852	PN 16	25 mm	624	444	75.5	44	20	21.3	129	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	970	700	75.5	126	25	33.7	219	140.0	100.0	18.0
(1)	Flange EN 1092-1	PN 40	DN 25	934	700	75.5	126	25	33.7	219	115.0	85.0	14.0
	Flange ANSI B16.5	Class 150	1"	967	700	75.5	126	25	33.7	219	108.0	79.2	15.7
	Flange ANSI B16.5	Class 600	1"	992	700	75.5	126	25	33.7	219	124.0	88.9	19.1
	Screwed connection DIN 11851	PN 40	DN 32	922	700	75.5	126	25	33.7	219	-	-	-
	Clamp ISO 2852	PN 16	38 mm	940	700	75.5	126	25	33.7	219	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	1100	850	75.5	180	0	48.3	273	170.0	125.0	22.0
(1½)	Flange EN 1092-1	PN 40	DN 40	1063	850	75.5	180	0	48.3	273	150.0	110.0	18.0
•	Flange ANSI B16.5	Class 150	11/2"	1100	850	75.5	180	0	48.3	273	127.0	98.6	15.7
	Flange ANSI B16.5	Class 600	11/2"	1128	850	75.5	180	0	48.3	273	155.4	114.3	22.4
	Screwed connection DIN 11851	PN 25	DN 50	1090	850	75.5	180	0	48.3	273	-	-	-
	Clamp ISO 2852	PN 25	51 mm	1062	850	75.5	180	0	48.3	273	-	-	-

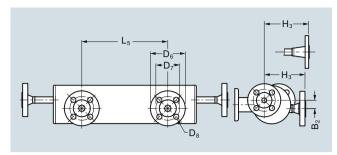
SITRANS F C

# Flow sensor MASS 2100 DI 3 to DI 40

For not listed variants please contact product support.

Sensor size	Connections			L1 inch	L2 inch	L3 inch	H1 inch	B1 inch	D1 inch	D2 inch	D3 inch	D4 inch	D5 inch
DI (inch)	Туре	Pressure rating	Size		111011	IIICII	IIICII	IIICII	mon	IIICII	mon	IIICII	men
DI 3	Pipe thread ISO 228/1 - G1/4	PN 100	1/4"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - 1/4" NPT	PN 100	1/4"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	22.83	15.35	2.44	1.57	0.47	0.67	4.09	3.94	2.76	0.55
(1/4)	Flange EN 1092-1	PN 40	DN 10	22.05	15.35	2.44	1.57	0.47	0.67	4.09	3.54	2.36	0.55
	Flange ANSI B16.5	Class 150	1/2"	24.57	15.35	2.44	1.57	0.47	0.67	4.09	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	1/2"	23.94	15.35	2.44	1.57	0.47	0.67	4.09	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 10	20.94	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
	Clamp ISO 2852	PN 16	25 mm	22.44	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	24.96	17.48	2.97	1.73	0.79	0.84	5.08	2.95	4.13	0.55
(1/2)	Flange EN 1092-1	PN 40	DN 15	24.41	17.48	2.97	1.73	0.79	0.84	5.08	3.74	2.56	0.55
	Flange ANSI B16.5	Class 150	1/2"	25.16	17.48	2.97	1.73	0.79	0.84	5.08	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	1/2"	25.98	17.48	2.97	1.73	0.79	0.84	5.08	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 15	23.07	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
	Clamp ISO 2852	PN 16	25 mm	24.57	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	38.19	27.56	2.97	4.96	0.98	1.33	8.62	3.94	5.51	0.71
(1)	Flange EN 1092-1	PN 40	DN 25	36.77	27.56	2.97	4.96	0.98	1.33	8.62	4.53	3.35	0.55
	Flange ANSI B16.5	Class 150	1"	38.07	27.56	2.97	4.96	0.98	1.33	8.62	4.25	3.12	0.62
	Flange ANSI B16.5	Class 600	1"	39.06	27.56	2.97	4.96	0.98	1.33	8.62	4.88	3.50	0.75
	Screwed connection DIN 11851	PN 40	DN 32	36.30	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
	Clamp ISO 2852	PN 16	38 mm	37.01	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	43.31	33.46	2.97	7.09	0	1.9	10.75	4.92	6.69	0.87
(1½)	Flange EN 1092-1	PN 40	DN 40	41.85	33.46	2.97	7.09	0	1.9	10.75	5.91	4.33	0.71
	Flange ANSI B16.5	Class 150	11/2"	43.31	33.46	2.97	7.09	0	1.9	10.75	5	3.88	0.62
	Flange ANSI B16.5	Class 600	11/2"	44.41	33.46	2.97	7.09	0	1.9	10.75	6.12	4.50	0.88
	Screwed connection DIN 11851	PN 25	DN 50	42.91	33.46	2.97	7.09	0	1.9	10.75	-	-	-
	Clamp ISO 2852	PN 25	51 mm	41.81	33.46	2.97	7.09	0	1.9	10.75	-	-	-

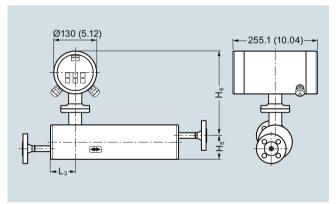
## MASS 2100 sensor with "heating jacket"



Dimensions in mm (inch)

Sensor size	Connec- tions heated			L5	H3	B2	D6	D7	D8
DI (inch)	Туре	Pressure rating	Size	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	1/2"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (1/4)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	1/2"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class150	1/2"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 25 (1)	EN 1092-1	PN 40	DN 15	420 (16.54)	213.6 (8.41)	60 (2.36)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	1/2"	420 (16.54)	223.2 (8.79)	60 (2.36)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 40 (1½)	EN 1092-1	PN 40	DN 15	500 (19.68)	267.5 (10.53)	43 (1.69)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	1/2"	500 (19.68)	277.1 (10.91)	43 (1.69)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

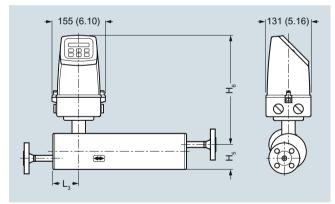
## MASS 2100 and MASS 6000 Ex d compact version



Dimensions in mm (inch)

Sensor size [DI (inch)]	L <sub>3</sub> [mm (inch)]	H <sub>5</sub> [mm (inch)]	H <sub>6</sub> [mm (inch)]	H <sub>5</sub> + H <sub>6</sub> [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (1/4)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1½)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

MASS 2100 and MASS 6000 IP67 compact version



Dimensions in mm (inch)

Sensor size [DI (inch)]	L <sub>3</sub> [mm (inch)]	H <sub>5</sub> [mm (inch)]	H <sub>6</sub> [mm (inch)]	H <sub>5</sub> + H <sub>6</sub> [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (1/4)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

#### SITRANS F C

#### Flow sensor MC2

#### Overview



SITRANS F C MC2 is available in sizes DN 100 and DN 150 (4" and 6").

The MC2 sensor is suitable for accurate mass flow measurement of a variety of liquids.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy and delivers true multi-parameter measurements i.e.: mass flow, volume flow, density, temperature and fraction flow.

The very compact sensor construction makes installation and commissioning of even the largest sizes very straight forward and easy.

#### Benefits

- High accuracy better than 0.15 % of mass flow rate
- · Large dynamic turn-down ratio
- Densitometer performance available through density accuracy better than 0.001 g/cm<sup>3</sup>
- Space-saving split-flow sensor design facilitating low pressure loss
- Parallel S-tube design and optimal oriented inductive sensors enhances accuracy and turn-down ratio.
- Self-draining in both horizontal and vertical position
- Rigid enclosure design reduces the influence from pipeline vibration and thermal stress
- 4-wire Pt100 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- SENSORPROM enables true "plug & play" installed and commissioned in less than 10 minutes.
- Safe Ex design Ex em [ib] IIC
- Sensor pipe available in high-quality stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610 offering optimum corrosion resistance.
- CIP cleanability for food and beverage and pharmaceutical applications

#### Application

Coriolis mass flowmeters are suitable for measuring all liquids. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity, and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turndown ratio which is paramount in many applications.

MC2 sensors are not designed or approved for flow measurement of gaseous process media.

The product is manufactured by ABB Automation Products GmbH and distributed by Siemens.

The main applications of the Coriolis flowmeter can be found in all industries, such as:							
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis						
Food and beverage	Dairy products, beer, wine, soft-drinks, Plato/Brix, fruit juices and pulps, bottling, CO <sub>2</sub> dosing, CIP-liquids						
Oil and gas	Liquid measurement, furnace con- trol, test separators, LPG, oil bun- kering						
Water and waste water	Dosing of chemicals for water treatment						

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task. MC2 ist **not** recommended for gas applications.

#### Design

The MC2 sensor consists of 2 parallel measuring pipes, welded directly onto a flow-splitter at each end to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations.

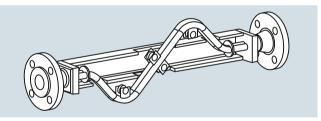
The flow-splitters are welded onto a rigid sensor housing which acts as a mechanical low-pass filter.

The sensor is available in 2 material configurations, AISI 316L/1.4436 or Hastelloy C4/2.4610 with a wide variety of process connections.

The enclosure is made of stainless steel AISI 304/1.4301 with an encapsulation grade of IP67/NEMA 4.

The sensor is Ex-approved Ex em [ib] IIC.

It can be installed in horizontal or vertical position, and is self-draining in both positions.



The MC2 Ex version sensor is based on a different Ex concept than MASS 6000. Therefore the MC2 Ex version sensor can only be connected to MASS 6000 IP67, MASS 6000 19" or SIFLOW FC070 standard versions, which have to be remote mounted in the safe area. MASS 6000 Ex d, MASS 6000 19" Ex and SIFLOW FC070 Ex can **not** be used with MC2 Ex sensors.





Hazardous area Zone 1 + 2

Safe area

Flow sensor MC2

## Function

The measuring principle is based on the Coriolis effect. See "System information Coriolis mass flowmeters".

#### Integration

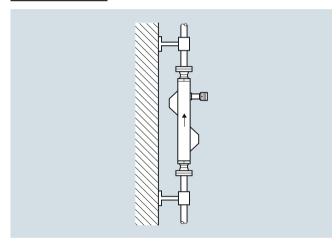
#### Installation guidelines MC2 DN 100 and DN 150

#### Installation of sensor

Rigid mounting brackets must be used when installing the sensor. The brackets must be installed as close to the sensor as possible, attached to the piping outside the process connections

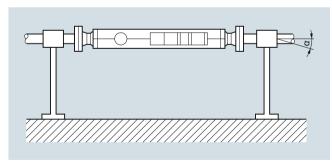
The optimal installation orientation is a vertical installation with an upward flow as shown in the following figure. This has the advantage that any solids contained in the fluid will settle downward and gas bubbles will move upward out of the meter tube when the flow rate is zero. Additionally, it is easy to drain the meter tube. Deposits can thereby be avoided.

## Vertical orientation:

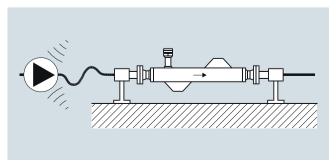


Vertical installation self-draining (upward flow)

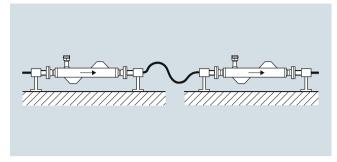
#### Horizontal orientation, self-draining



## Avoid vibrations

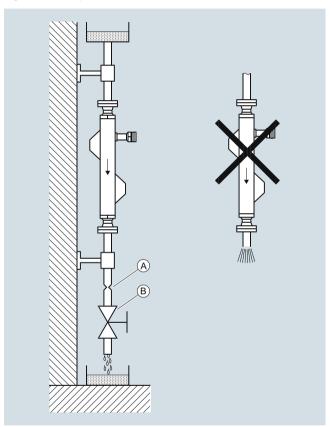


#### Avoid cross talk



## Installation in a drop line

Mount with reduction (A) or orifice (B) to prevent partially draining (min. back pressure: 0.2 bar).



Installation in a drop line

SITRANS F C

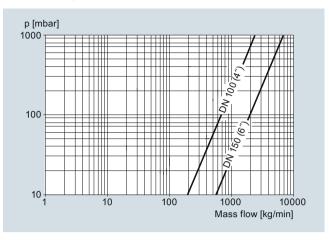
## Flow sensor MC2

## Technical specifications

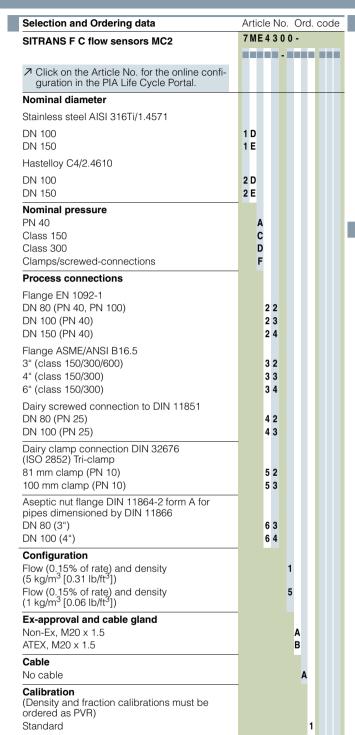
Versions (mm (inch))		100 (4)	150 (6)
Inside pipe diameter	mm (inch)	43.1 (1.69)	76.1 (2.99)
Pipe wall thickness	mm (inch)	2.6 (0.10)	3.2 (0.13)
Mass flow measuring range at pressure drop of 2 bar (29 psi) at 1 g/cm <sup>3</sup> (0.036 lb/inch <sup>3</sup> )	kg/h (lb/h)	203 500 (448 640)	602 000 (1 327 181)
Density	g/cm <sup>3</sup> (lb/inch <sup>3</sup> )	0.5 3.5 (0	.18 0.126)
Fraction e.g. Brix	°Brix	0 100 (on request)	Not possible
Temperature			
Standard-version		-50 +200 °C	(-58 +392 °F)
Ex-version		-50 +200 °C	(-58 +392 °F)
Liquid pressure measuring pipe			
Stainless steel (DIN 2413, 20 °C (68 °F))	bar (psi)	40 (580)	40 (580)
Materials			
Measuring pipe			ISI 316Ti/1.4571 C4/2.4610
Enclosure		IP	67
Enclosure material/ connection box			01)/aluminum, 40 bar (580 psi)
Process connections		See dimension	onal drawings
Electrical connections		Screw term	ninals, M 20
Cable			m <sup>2</sup> twisted and rs, ext. Ø 12 mm
Cable length			or 150 m 46 or 492 ft.)
Ex-version			
ATEX 1443X		II 2G Ex em	[ib] IIC T2-T6
Weight approx.	kg (lb)	91 (201)	261 (573)

For accuracy specifications see "System information Coriolis mass flowmeters".

## Pressure drop



Flow sensor MC2



Dairy MLFB example	Article No.
MC2 sensor	7 M E 4 3 0 0 -
Sensor size DN 100. AISI 316Ti/1.4571 Nominal pressure: Clamps DIN 11851, DN 100, PN 25	1 D F 4 3
6 In	
Configuration/calibration type: flow and density (5 kg/m³ [0.31 lb/ft³])	1
Without Ex appproval	Α
No cable	A
Standard calibration	

Selection and Ordering data	Order code
<b>Additional information</b> Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	C11
Material certificate EN 10204-3.1	C12
Material certificate according to NACE	C16
Tag name plate, stainless steel	Y17
Tag name plate, plastic self-adhesive	Y18
Customer-specified, matched pair (5 x 2)	On request
Customer-specified calibration (5 x 2)	On request
Customer-specified, matched pair (10 x 1)	On request
Customer-specified calibration (10 x 1)	On request

#### Operating instructions for SITRANS F C MC2

This device is shipped with ABB documentation and an installation/connection instruction in four languages (Article No. A5E34730442).

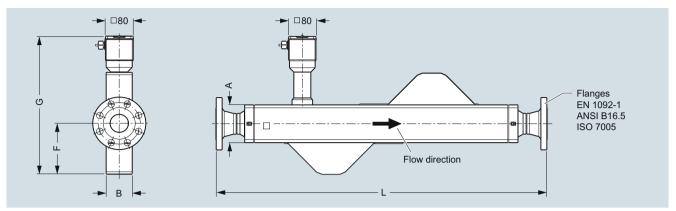
All literature is also available for free at: http://www.siemens.com/flowdocumentation

SITRANS F C

## Flow sensor MC2

## Dimensional drawings

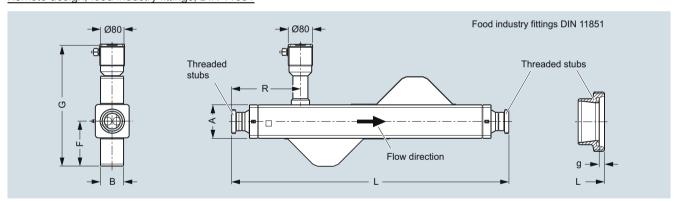
Remote design, flanged construction, DIN EN/ANSI



Meter size	r	Proce conne tion s	ec-	L [mm (inch)]	nm (inch)]					G <sup>1)</sup> [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	Weight [kg (lb)]
inch	DN	inch		DIN 11864-2 form A	EN 1092-1 PN 40	EN 1092-1 PN 100	ANSI B16.5 CL 150	ANSI B16.5 CL 300	ANSI B16.5 CL 600					
4	100	3	80	1618 (63.70)	1640 (64.57)	1680 (66.14)	1660 (65.35)	1680 (66.14)	1702 (67.01)	500	215	131	170	84 (185)
		4	100	1463 (57.60)	1480 (58.27)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)	(19.69)	(8.46)	(5.16)	(6.69)	91 (201)
		6	150	N/A	1778 (69.92)	N/A	1806 (71.10)	1826 (71.89)	N/A					120 (265)
6	150	6	150	N/A	2040 (80.31)	N/A	2070 (81.50)	2090 (82.28)	N/A	613 (24.13)	285 (11.22)	190 (7.84)	260 (9.84)	260 (573)

<sup>1)</sup> For Ex add 54 mm

Remote design, food industry fittings, DIN 11851

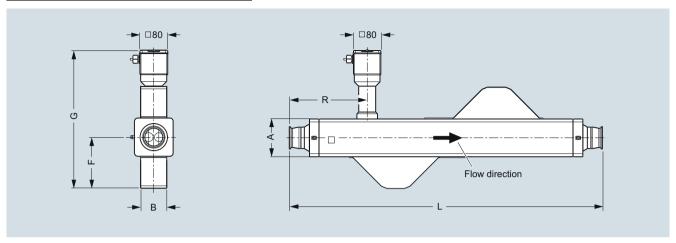


Meter	er size Process connection size		on size	L [mm (inch)]	g [mm (inch)]	G <sup>1)</sup> [mm (inch)]	F [mm (inch)]	B [mm (inch)]		R [mm (inch)]	Weight [kg (lb)]	
inch	DN	inch	DN									
4	100	3	80	Rd 110 x 1/6	1618 (63.70)	8 (0.31)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	401 (15.79)	82 (180)
		4	100	Rd 130 x 1/4	1463 (57.60)	10 (0.39)					314 (12.36)	86 (190)

<sup>1)</sup> For Ex add 54 mm

Flow sensor MC2

## Remote design, Tri-clamp DIN 32676 (ISO 2852)



Dimensions in mm (inch)

Meter siz	Meter size Process connection size		L [mm (inch)] ± 3	G <sup>1)</sup> [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	R [mm (inch)]	Weight [kg (lb)]	
inch	DN	inch	DN							
4	100	3	80	1598 (62.91)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	440 (17.32)	71 (157)
		4	100	1448 (57.01)					365 (14.37)	69 (152)

<sup>1)</sup> For Ex add 54 mm

## SITRANS F.C.

## Flow sensor MC2

#### **Process Connections**

- Flanges EN 1092-1/ANSI B16.5
- Tri-Clamp DIN 32676 (ISO 2852)
   DN 100: Series 1
- Food Industry fittings DIN 11851

The max. allowable operating pressure is a function of the process connection type, the fluid temperature, the bolts and the gaskets.

#### Pressure Rating

 PN 16, PN 40 Class 150, Class 300

#### Housing as secondary containment

Max. 40 bar

#### Pressure Equipment Directive 97/23/EG

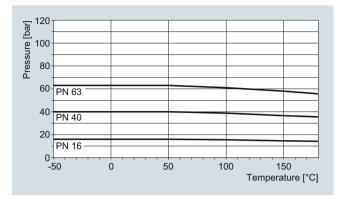
• Conformity evaluation category III, fluid group 1

Corrosion resistance of measuring pipe material to measuring medium has to be considered.

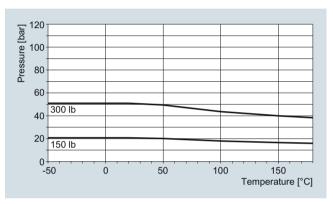
#### Material strength for process connections

Process connection	Size		PS <sub>max.</sub> at 20 °C (68 °F)	TS <sub>max</sub> .	TS <sub>min.</sub>	
	DN	inch	bar (psi g)	°C (°F)	°C (°F)	
Thread acc. DIN 11851	100	4	25 (363)	140 (284)	-40 (-40)	
Tri-Clamp acc. DIN 32676	100	4	10 (145)	120 (248)	-40 (-40)	

#### Pressure/temperature curves



DIN-Flanges stainless steel AISI 316Ti/1.4571 to DN 100 (4")



ASME-Flanges stainless steel AISI 326Ti/1.4571 to DN 100 (4")

For further information on the PED standard and requirements, see page 9/6.

#### Inline ultrasonic flowmeters

#### Overview

Siemens offers two types of ultrasonic flowmeters, inline flowmeters and clamp-on flowmeters. This offers the end user the maximum flexibility to choose the technology that best fits his needs. This chapter shows the inline versions.



SITRANS F US inline ultrasonic flowmeters measure flow of electrically conductive and non-conductive liquids.

#### Benefits

- Greater flexibility:
- Sensor sizes from DN 50 to 1 200 mm (2" to 48")
- Inline retrofit as 1-path and 2-path up to DN 4 000 (160")
- Compact and remote transmitter installation HART and PROFIBUS PA communication
- Mains or battery powered solutions
- Dedicated transmitter portfolio for HVAC, power generation, utility and general industry as well as more demanding applications
- Easier service:
  - Comprehensive self-diagnostic for error indication and log-
  - Exchange of the transducers without interrupting operation
  - Battery lifetime of up to 6 years
- Approvals/certificates:
  - Custody transfer approvals within district heating

  - Standard with calibration certificate

# Application

Inline ultrasonic flowmeters are suitable for measuring the flow of liquids with good acoustic permeability, independent of conductivity, viscosity, temperature, density and pressure.

- max. 3 % solids
- max. 3 % air and gas
- max. 350 cSt

The main applications can be found in the following sectors:

- Raw water intake for water treatment plants
- Treated waste water
- Power generation and utility
- · Oil and gas industry and petrochemical industry
- Irrigation systems
- Cooling water plants within the industry and in power stations
- Plants transporting non-conductive liquids
- HART/4 to 20 mA output
- PROFIBUS PA
- ATEX

# SITRANS F US Inline

# System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constrains might be related to some of the features: www.pia-portal.automation.siemens.com











	The same of the sa				
PAA-Selector®	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300	7ME3100	7ME3210/ 7ME3220	7ME3410	7ME3400
Industry					
Water, treated waste water	XXX	XX	XXX		XXX
rrigation	XX	XX	XXX		XXX
Utility, district heating water, cooling	XXX	XX	XXX	XXX	XXX
Jtillity, district heating, CT approvals required				XXX	
Dil	XX	XXX	XX		Х
Cryogenic fluids (only on request)		XXX			
Onshore and Offshore applications	XX	XXX	XX		Х
Chemical	XXX	XXX	X		
Design	7001	7001			
Fransmitter compact mounted			•	•	•
ransmitter compact mounted	•	•	•	•	•
ransducers can be replaced under pressure		•	•	-	-
Retrofit on existing steel pipes/non-weldable			•		
Transmitter enclosure					
Polyamid, IP67			•	•	•
Die-cast aluminum (painted), IP65	•	•	•		
Communication					
HART	•	•	•		
PROFIBUS PA	•	•	•		
Power supply					
3.6 V Battery			•	•	•
115 230 V AC	•	•	•	•	•
115 230 V AC 1115 230 V AC and 3.6 V battery backup			-	•	•
24 V AC/DC	•	•	•		
Accuracy					
0.25 % (with 4-path system on request)		•			
0.50 %	•	•	•	•	•
Sensor design			<u> </u>	<u> </u>	
			<b>●</b> <sup>1)</sup>		
I-path ultrasonic measurement (special request) 2-path ultrasonic measurement	•	•	•	•	•
1-path ultrasonic measurement (special request)		•	•		
Dimension					
DN 50 2"	•	●2)		•	•
DN 65 2½"	•	•2)			
DN 80 3"	•	•2)		•	•
ON 100 4"	•	•	<b>●</b> 1)	•	•
DN 125 5"	•	•	● <sup>1)</sup>	•	•
DN 150 6"	•	•	<b>●</b> <sup>1)</sup>	•	•
DN 200 8"	•	•	•	•	•
DN 225 9"	•	•	•	•	•
DN 250 10"	•	•	•	•	•
DN 300 12"	•	•	•	•	•
DN 350 14"		•	•	•	•
DN 400 16"		•	•	•	•
DN 500 20"		•	•	•	•
DN 600 24"		• 2)	•	•	•
DN 700 28"		● <sup>2)</sup>	•	•	•

X = can be used, XX = often used, XXX = most often used, ● = available

SONOKIT 1-path DN 100 to DN 2400 and 2-path DN 200 to DN 4000
 Only available as PVR (product variation request - special request)

# System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constrains might be related to some of the features:

www.pia-portal.automation.siemens.com











PIA-Selector <sup>®</sup>	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300	7ME3100	7ME3210/ 7ME3220	7ME3410	7ME3400
Dimension (continued)					
DN 800 32"		<b>●</b> <sup>2)</sup>	•	•	•
DN 900 36"		● <sup>2)</sup>	•	•	•
DN 1000 40"		<b>●</b> <sup>2)</sup>	•	•	•
DN 1200 48"		<b>●</b> <sup>2)</sup>	● <sup>5)</sup> ●1) 5)	•	•
DN 1400 4000 54" 160"  Process connection			0.7-7		
	•	•		•	•
Flanges	•			•	•
Flangeless (for weld-in)		•			
Flanges Norm					
EN 1092-1	•	•		•	•
EN 1759-1	•	•			
ANSI B16.5		•			
Pressure rating					
PN 6			•		
PN 10	•	•	•		
PN 16	•	•	•	•	•
PN 25		•	•	•	•
PN 40	•	•	•	•	•
Class 150	•	•			
Class 300	•	•			
Pipe, flange and transducer mate	erial				
Carbon steel	•	•	•	•	•
Stainless steel		on request	•		
Die cast bronze				•	•
Other materials		on request	on request		
Media temperature					
°C °F					
-20 -4		•	•		
-10 +14	•	•	•		
+2 +35.6	•	•	•	● <sup>6)</sup>	•
+60 +140	•	•	•	•	•
+120 +248	•	•	•	●3)	•3)
+150 +302	•	•	•	● <sup>4)</sup>	● <sup>4)</sup>
+160 +320	•	•	•	•	•
+190 +374		•	•	•	•
+200 +392		•	•	•	•
Measuring principle					
Transit time principle	•	•	•	•	•
manor unto principio		-	_	_	

<sup>• =</sup> available

SONOKIT 1-path DN 100 to DN 2400 and 2-path DN 200 to DN 4000 Only available as PVR (product variation request - special request).

Compact

<sup>4)</sup> Pipe material bronze brass

<sup>5)</sup> SONOKIT with FUS080 up to DN 1200

<sup>6)</sup> Min. 5 °C (41 °F)

SITRANS F US Inline

# System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constrains might be related to some of the features: www.pia-portal.automation.siemens.com









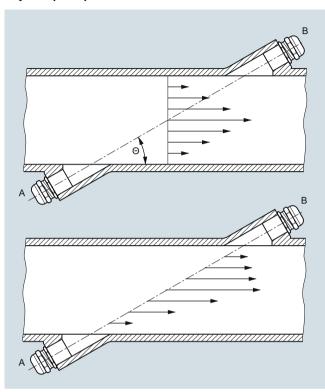


PIA-Selector <sup>0</sup>	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300	7ME3100	7ME3210/ 7ME3220	7ME3410	7ME3400
Approvals					
Custody transfer approval					
MID, MI-004, EN 1434 (European energy meter standard)				•	
Other country-specific type approval available for:					
- Russia	•	•	•	•	•
- China				•	
Ex approval					
Ex d ATEX		•	•		
Ex i ATEX	•	•	•		

<sup>• =</sup> available

#### Function

#### Physical principle



Velocity distribution along sound path

A sound wave traveling in the same direction as the liquid flow arrives at point B from point A in a shorter time than the sound wave traveling against the direction of flow (from point B to A). The difference in sound transit time indicates the flow velocity in the pipe.

Since delay time is measured at short intervals both in and against flow direction, viscosity and temperature have no influence on measurement accuracy.

### Measuring principle

In SITRANS F US flowmeters the two ultrasonic transducers are placed at an angle  $\theta$  in relation to the pipe axis. The transducers function as transmitters and receivers of the ultrasonic signals. Measurement is performed by determining the time the ultrasonic signal takes to travel with and against the flow. The principle can be expressed as follows:

$$V = K \cdot (t_{B,A} - t_{A,B}) / (t_{A,B} \cdot t_{B,A}) = K \cdot \Delta t / t^2$$

v = Average flow velocity

t = Transit time

K = Proportional pipe geometry factor

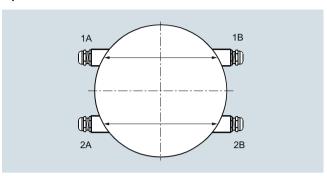
This measuring principle offers the advantage that it is independent of variations in the actual sound velocity of the liquid, i.e. independent of the temperature.

Proportional factor K is determined by wet calibration.

#### Direct signal processing

The ultrasonic signal is sent directly between the transducers. The advantage gained sending signals from point to point is an extremely good signal strength.

#### 2-path solution



Ultrasonic 2-path flowmeter with 4 transducers. In the upper path transducers 1A / 1B and in the lower path 2A / 2B are displayed.

The accuracy of ultrasonic flowmeters depends on the pipe geometry before and after the flowmeter and the number of ultrasonic measuring paths.

When water flows through a pipe, it has a tendency to swirl and/or flow with different velocities inside the pipe, depending on the pipe design.

A 2-path ultrasonic flowmeter offers:

- less sensitivity to upstream obstruction like bends, pumps or valves
- high security in the measurements as the meter continues to measure even if, for some reason, one path stops working.

Typical straight inlet requirements are upstream  $10 \times D_i$  ( $D_i$  = diameter of the flowmeter) and downstream  $3 \times D_i$ .

Typical accuracy that can be reached with 2-path ultrasonic flow metering is  $\pm\,0.5\,$  % with installations according to above demands.

#### 4-path ultrasonic flowmeters

Some applications require accuracy under extreme short inlet conditions and swirl that cannot be obtained with 2-path solutions.

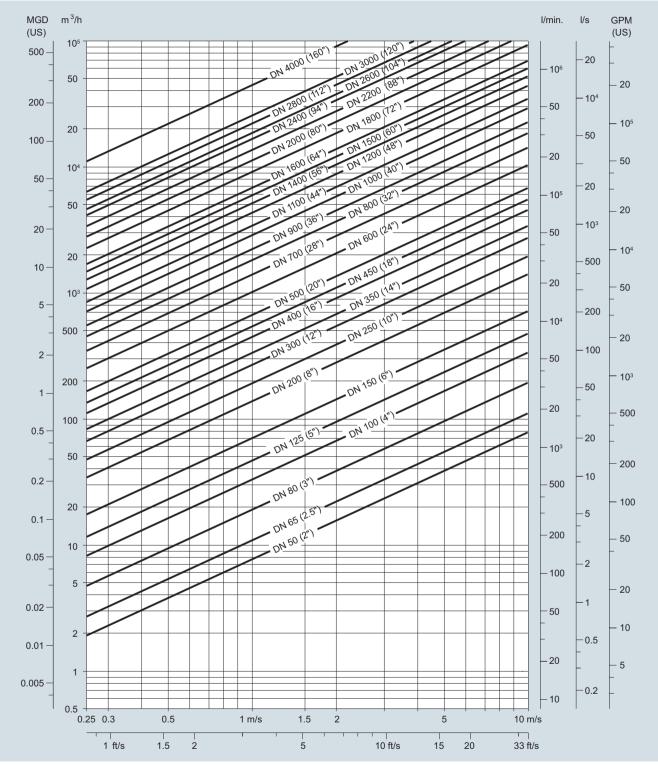
For these applications we can offer a 4-path solution – customer-specified – according to actual inlet conditions.

Please contact Siemens Flow Instruments for specific applications.

SITRANS F US Inline

# System information SITRANS F US Inline ultrasonic flowmeters

# Technical specifications



Nominal size and flow

#### Guidelines for selection of sensor

Min. measuring range: 0 ... 1 m/s

• Max. measuring range: 0 ... 10 m/s

Nominal flow velocity:

• Normal: 1 ... 3 m/s

• Minimum: not permanently below 0.5 m/s

• Maximum: up to 8 m/s

Flow velocity calculation formula:

•  $v = (4 \times Q_{max}) / (\pi \times D_i^2 \times 3600)$ 

• v in m/s, Q<sub>max</sub> in m<sup>3</sup>/h, D<sub>i</sub> in m

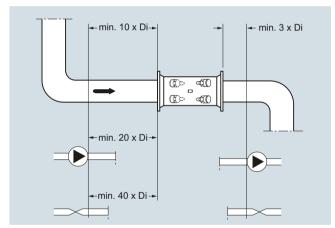
Additional to the flow velocity check it is recommended to observe the Reynolds number (Re):

The optimal performance of the flowmeter is with a Re above 10 000, which is typical for flow velocities (water) above 0.5 m/s. Avoid an Re value between 2000 and 5000. In order to observe this and to be above the recommended 0.5 m/s flow velocity limit the sensor size must be reduced.

Re formula:  $Re = V \times Di / Viscosity$ 

V in m/s, Di in m, Viscosity in cSt (X x E<sup>-6</sup> m<sup>2</sup>/s) Example: Viscosity for water at 20 °C = 1 x  $E^{-6}$  m<sup>2</sup>/s

#### Inlet and outlet conditions



Recommended inlets and outlets

To maximize performance inlet and outlet must be straight. There must be a certain distance between flowmeter and bends, pumps and valves. It is also important to centre the flowmeter in relation to pipe flanges and gaskets.

Valves must always be installed after the flowmeter. The only exception is installation of the sensor in a vertical pipe. In this case a valve below the sensor is necessary to allow zero point adjustment. It is important to select a valve which does not alter the flow when fully open.

Recommended	l intel/endet		
Recommended	SONO 3300, SONO 3100, SONOKIT 2-path	FUS380/FUE380 <sup>1)</sup>	SONOKIT 1-path
90° bend	10 x D <sub>i</sub>	10 x D <sub>i</sub>	20 x D <sub>i</sub>
Fully opened valve	10 x D <sub>i</sub>	10 x D <sub>i</sub>	20 x D <sub>i</sub>
Partially opened valve	$40 \times D_i$	40 x D <sub>i</sub>	40 x D <sub>i</sub>
2 x 90° bends in same plane	15 x D <sub>i</sub>	15 x D <sub>i</sub>	25 x D <sub>i</sub>
2 x 90° bends in two planes	20 x D <sub>i</sub>	20 x D <sub>i</sub>	40 x D <sub>i</sub>
Reductions	$10 \times D_i$	10 x D <sub>i</sub>	20 x D <sub>i</sub>
(Outlet 0 x D <sub>i)</sub> Pumps	20 x D <sub>i</sub>	20 x D <sub>i</sub>	40 x D <sub>i</sub>
Outlet	3 x D <sub>i</sub>	3 x D <sub>i</sub>	3 x D <sub>i</sub>

<sup>1)</sup> Inlet for FUE380 with MID approval should be for sizes ≥ DN 80: 1.5 m

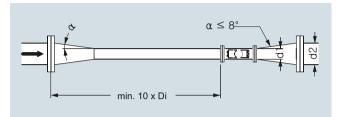
#### Reductions

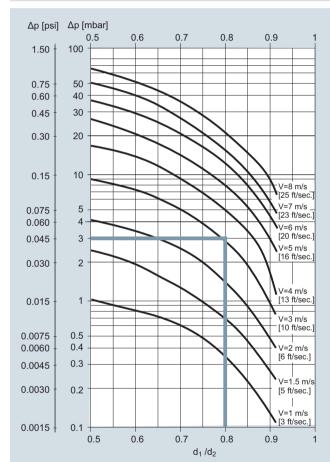
The flowmeter can be installed between two reducers (e.g. DIN 28545). At 8° the pressure drop curve below applies.

System information SITRANS F US Inline ultrasonic flowmeters

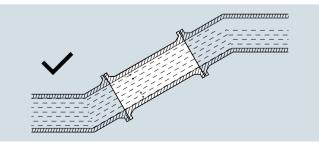
#### Example:

A flow velocity of 3 m/s (V) in a sensor with a diameter reduction from DN 250 to DN 200  $(d_1/d_2 = 0.8)$  gives a pressure drop of





The sensor must always be completely filled with liquid:

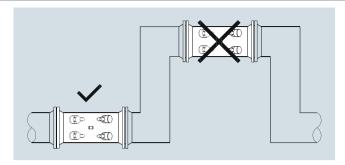


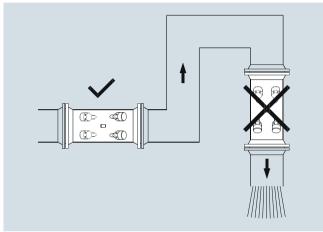
The following installations must be avoided:

- Installation at the highest point of the pipe system
- Installation in vertical pipes with free outlet

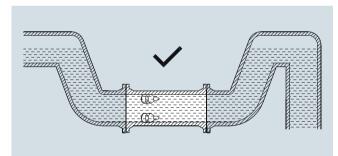
#### SITRANS F US Inline

# System information SITRANS F US Inline ultrasonic flowmeters

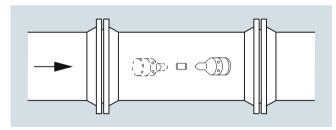




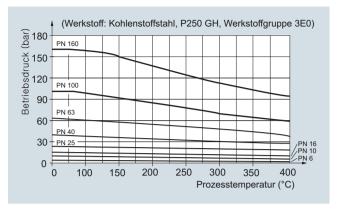
With partially full pipes or pipes with free outlet the flowmeter should be located in a U-shaped tube:

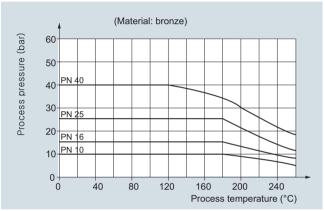


Installing the transducers in horizontal position is recommended:

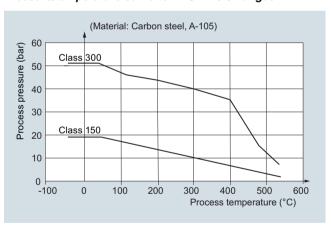


#### Pressure/temperature curve to EN (DIN) flanges





#### Pressure/temperature curve to ANSI B16.5 flanges



**Note:** The pressure/temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

#### Reference conditions

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

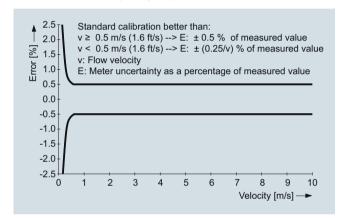
Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offer accredited calibrations assured to ISO 17025. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

Flowmeter calibration data are stored in the internal EEPROM of the transmitters FUS060 or FUS080.

The system accuracy refers to the following systems:

SONO 3300/FUS060, SONO 3100/FUS060<sup>1)</sup> which are typically calibrated on the frequency output.



#### Typical calibration reference conditions:

Fluid temperature
Ambient temperature

Supply voltage

Straight inlet length

Outlet

Fluid

Rangeability Repeatabilty

Linearity (for water) • Reynolds number 1000 < Re < 5000

• Reynolds number > 5000

Water 22 ± 5 °C

22 + 5 °C

115/230 V AC +10 ... -15 % 24 V DC +25 ... -15 %,

24 V AC ±15 %

20 x D<sub>i</sub>  $3 \times D_i$ 

0 ... 1 m/s to 0 ... 10 m/s

Better than 0.25 % in the range

0.5 ... 10 m/s

Better than 1 %

Better than 0.5 %

#### Additional effects of deviations from reference conditions

- Current output: As frequency output (± 0.1 % of actual flow +0.05 % FSO)
- Effect of ambient temperature: Frequency/pulse output: < 0.005 % SPAN/K; Current output: < ± 0.0075 % SPAN/K
- Effect of supply voltage: 0.005 % of measuring value at 1 % change

<sup>1)</sup> Only systems with transmitter FUS060. For systems with transmitter FUS080 see chapter on FUS380 and FUE380.

SITRANS F US Inline

#### **Transmitter SITRANS FUS060**

#### Overview



SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering with dedicated sensors in the FUS inline series up to DN 4000. SITRANS FUS060 is engineered for high performance and is suitable for 1-path, 2-path and 4-path flowmeters.

#### Benefits

- Superior signal resolution for optimum turn down ratio
- Simple menu-based local operation with two-line display and four optical input elements, for unlimited use in potentially explosive atmospheres
- · Self-monitoring and diagnostic
- Operate up to 4 paths
- ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3
- Remote installation up to 120 m from sensor
- 1 analog output (4 to 20 mA) standard with HART-protocol,
   1 digital frequency or pulse output, 1 relay output for limit,
   alarms, flow direction
- PROFIBUS PA Profile 2, 1 digital frequency or pulse output

#### Design

The transmitter type FUS060 is designed for remote installation in non-hazardous or hazardous areas.

The transmitter is designed for use in a flowmeter system together with sensors type SONOKIT, SONO 3300 and SONO 3100.

The FUS060 is ordered as part of a complete flowmeter system. It can be ordered separately as spare part and manually programmed with the sensor data.

#### Application

The main application for flowmeters with the transmitter SITRANS FUS060 is measurement volume of flow within the general, petrochemical and chemical industries, power engineering and water and waste water, as well as various types of oils and liquid gases.

#### Integration

The transmitter output is often used as input for an automation system or as input for systems of remote reading.

The SITRANS FUS060 transmitter offers current, pulse and relay outputs as standard output functions and supports HART or Profibus PA communication.

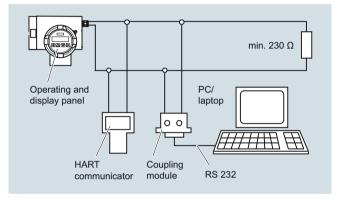
The settings of the transmitter output functions are individually programmed via keypad and display menu.

#### Function

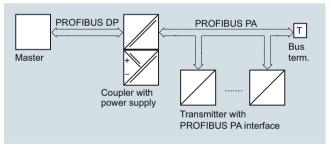
#### Displays and keypad

Operation of the SITRANS FUS060 transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication

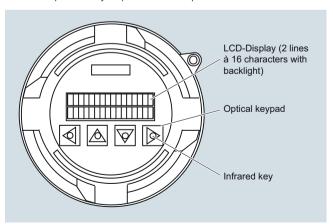


HART communication



#### PROFIBUS PA communication

The operating and display panel permits simple operation without supplementary equipment. It is not necessary to open the housing. All changes to a setting can therefore also be carried out in the potentially explosive atmosphere.



Operating and display panel

#### **Transmitter SITRANS FUS060**

The individual functions and parameters are selected using a hierarchical, multi-language input menu and four infrared keys. The parameters can be specifically selected and modified using codes, e.g.:

- Operating parameters such as measuring range, physical dimensions, device information
- Limits for flow, totalizer, ultrasonic velocity or ultrasonic ampli-
- Noise suppression using damping, error stages and hystere-
- Display parameters (freely-configurable display)
- Display in volume or mass dimensions
- Density as constant input value for conversion of volume into mass dimensions
- Forward/backward measurement
- Flow direction
- Diagnostics functions and control values
- Functions of the PROFIBUS PA output: flow, net quantity (volume or mass), ultrasonic velocity, ultrasonic amplitude, forward quantity (volume or mass), backward quantity (volume or mass)
- Functions of the analog output: flow, ultrasonic velocity or ultrasonic amplitude
- Functions of digital output 1: pulse output, frequency output, limit, flow direction or device status
- Functions of digital output 2: limit, flow direction or device status
- Simulation of output signal via analog output, digital output 1 and digital output 2

The HART protocol is implemented via the analog output (current output). Using this communication facility, the device can be parameterized with a PC/laptop and SIMATIC PDM software in addition to local operation.

In the version with PROFIBUS PA, the analog output is replaced by the digital PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

#### Technical specifications

#### Input

Measurement

Flow by measuring the transit time difference of ultrasonic sig-nals through ultrasonic transduc-ers in DN 100 ... 4000 2-path sensor pipes (optional, depending on selected size, 1-path or 4-path special solutions are possible).

Nominal diameters and number of paths

Max. cable length

2-path DN 100 ... DN 4000 (optionally also 1-path and 4-path, depending on size

120 m (395 ft) (shielded coaxial cable). For Ex version the transducer cable length is restricted to 3 m (9.84 ft) in order to meet requirements for electrical immunity. For 2-path and 4-path systems with sizes ≥ DN 3000 cable length is restricted to 30 m (98.4 ft).

#### Output

Function

Current output programmable for flow, sound velocity or amplitude

Analog output

- Signal range
- Upper limit
- Signal on alarm
- Load

Active current output (13.2 V < open loop voltage < 15.8 V) 4 ... 20 mA 20 ... 22.5 mA, adjustable

3.6 mA, 22 mA, or 24 mA Max. 600  $\Omega$ ; for non Ex version

 $\geq$  230  $\Omega$  for HART communication  $\leq$  330  $\Omega$  for Ex-version

Analog output omitted, is replaced by digital PROFIBUS PA interface

## Digital output 1

Function

- Pulse, frequency or status output - programmable for pulses, frequency, alarm,
- · Active or passive signal, can be configured with positive or negative logic

• Only PROFIBUS PA version:

- For explosion protection (ATEX version) and PROFIBUS PA
- Output function, configurable

limit or status

Active: 24 V DC, ≤ 24 mA,  $R_i = 300 \Omega$ Passive: open collector, 30 V DC, ≤ 200 mA

Only passive: open collector 30 V DC, ≤ 100 mA

Pulse output

- Adjustable pulse significance ≤ 5000 pulses/s
- Adjustable pulse width ≥ 0.1 ms

Frequency response

f<sub>END</sub> selectable up to 10 kHz

Limit for flow, totaliziers,ultrasonic velocity or ultrasonic amplitude device status, flow direction

# SITRANS F US Inline

# Transmitter SITRANS FUS060

Transmitter SITRANS FUS06	0		
Digital output 2		Rated operation conditions	
Function	Relay output - programmable for	Ambient conditions	
Relay, NC or NO contact	alarm, limit or status indication. Switching capacity max. 5 W	Ambient temperature	
Thelay, the of the contact	Max. 50 V DC, max. 200 mA DC	Operation	-20 +50 °C (-4 +122 °F)
	Self-resetting fuse, $R_i = 9 \Omega$	<ul> <li>In potentially explosive atmospheres</li> </ul>	Observe temperature classes
<ul> <li>For explosion protection (ATEX version)</li> </ul>	Max. 30 V DC, max. 100 mA DC, 50 mA AC (cf. EC-Type Examina-	<ul> <li>Storage</li> <li>Enclosure rating</li> </ul>	-25 +80 °C (-13 +176 °F) IP65 (NEMA 4)
(ATEX VEISION)	tion certificate)	Electromagnetic compatibility	For use in industrial environments
Output function, configurable	Limit for	Emitted interference	To EN 55011/CISPR-11
	flow, ultrasonic velocity or ultra- sonic amplitude	Noise immunity	To EN/IEC 61326-1 (Industry)
	flow direction device status	Medium conditions	The measuring media must be
Only PROFIBUS PA version:	Digital output 2 omitted		ultrasonic signal compatible. It must be homogeneous and not
Communication via	5 .		two-phased to transfer the acoustic ultrasonic signals.
analog output 4 20 mA		Process temperature	-200 +250 °C (-328 +482 °F)
PC/laptop or HART communicator with SITRANS F flowmeter			(not directly influenced by medium temperature)
- Load with connection of coupling module	min. 230 $\Omega$ (max. 330 $\Omega$ for Ex-version)	Gases/solids	Influence accuracy of measurement (approx. max. 3 % gases or
<ul> <li>Load with connection of HART communicator</li> </ul>	min. 230 Ω	Design	solids)
- Cable	2-wire shielded	Separate version	Transmitter is connected to the
	≤ 3 km (≤ 1.86 miles) Multi-core shielded	Coparato Volcion	transducers via 3 120 m
	≤ 1.5 km (≤ 0.93 miles)		(9.8 395 ft) long specially shielded cables (coaxial cable)
- Protocol	HART, version 5.1		For ATEX versions mounted in the Ex area only with 3 m (9.8 ft) long
Communication via PROFIBUS PA interface	Layers 1 + 2 according to PROFIBUS PA		cables.
	Communication system accord-	Enclosure material	Die-cast aluminum, painted
Power supply	ing to IEC 61158/EN 50170 Separate supply, four-wire device	Wall mounting bracket (standard and special)	Stainless steel (standard: always incl.)
or ower supply	Permissible bus voltage 9 32 V	Weight of transmitter	4.4 kg (9.7 lb)
- Commant a anatomism from lave	See certificates and approvals	Electrical connection	Cable glands (always incl.)
Current consumption from bus	10 mA; ≤ 15 mA in event of error with electronic current limiting		<ul><li>Power supply and outputs</li><li>2 x M20 (HART)/</li></ul>
Electrical isolation	Outputs electrically isolated from		M25 (PROFIBUS) or
	power supply and from one another		- 2 x ½"-NPT (HART)  • Transducers/sensor
Accuracy			- 2/4 x M16 or
Error in measurement		Displays and controls	- 2/4 x ½" NPT
(at reference conditions)	C . O.F. O/ of reasoning division at	Displays and controls  Display	LCD, two lines with 16 characters
Pulse output	$\leq$ ± 0.5 % of measured value at 0.5 10 m/s or		each
	$\leq$ ± 0.25/V[m/s] % of measured	<ul> <li>Multi-display:</li> <li>2 freely-selectable values are dis-</li> </ul>	Flow, volume, mass flow, mass, flow velocity, speed of sound,
Analog output	value at flow < 0.5 m/s As pulse output plus ± 0.1 % of	played simultaneously in two lines	ultrasonic signal information, cur- rent, frequency, alarm information
Analog output	measured value, $\pm 20 \mu\text{A}$	Operation	4 infrared keys,
Repeatability	$\leq$ ± 0.25 % of measured value at 0.5 10 m/s	Operation	hierarchical menu shown with codes
Reference conditions (water)		Power supply	
Process temperature in the	25 °C ± 5 °C (77 °F ± 9 °F)	Supply voltage	
<ul><li>connected sensor</li><li>Ambient temperature at the</li></ul>	25 °C ± 5 °C (77 °F ± 9 °F)	Standard version	120 230 V AC ± 15 % (50/60 Hz) or 19 30 V DC/
transmitter	,	. Formation	21 26 V AC
Transmitter warming-up time  Installation conditions of connected	30 min.	Ex version  Power failure	19 30 V DC/21 26 V AC
sensor	Upstream section > 10 x DN and downstream section > 5 x DN	Power failure	No effect for at least 1 period (> 20 ms)
		Power consumption	Approx. 10 VA/10 W
		Certificates and approvals	
		Explosion protection	ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3
			T6 for media < 85 °C (185 °F)
			T5 for media < 100 °C (212 °F) T4 for media < 135 °C (275 °F)
			T3 for media < 200 °C (392 °F)

#### **Transmitter SITRANS FUS060**

#### Coaxial cable

#### **Standard Coaxial** cable (75 $\Omega$ )

Coaxial cable with SMB straight plug on one end for connection to the FUS060

Ø 5.8 mm

black PE

Outside diameter

Length

3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter

Material (outside jacket)

-10 ... +70 °C (14 ... 158 °F) Ambient temperature

**High temperature** Coaxial cable (75  $\Omega$ )

Coaxial cable with SMB straight plug on one end for the connection to FUS060

Outside diameter

Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)

Length

3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max 3 m 9.84 ft) transducer cable length for Ex area mounted transmitters)

Material (outside

jacket)

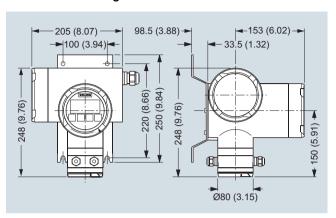
Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)

Ambient temperature

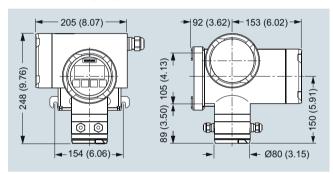
-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE

for remaining transmitter cable part)

# Dimensional drawings

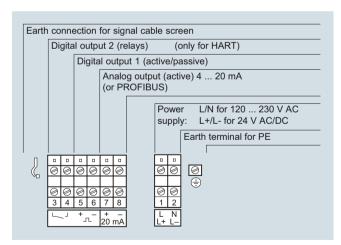


SITRANS FUS060 with standard mounting bracket, dimensions in mm (inch)



SITRANS FUS060 with optional special mounting bracket, dimensions in mm (inch)

# Schematics



Electrical connection SITRANS FUS060

SITRANS F US Inline

# **Transmitter SITRANS FUS060**

#### Transmitter FUS060 operating instructions, accessories and spare parts

#### Operating instructions

Description	Article No.	
• English	A5E01204521	
<ul> <li>German</li> </ul>	A5E02123845	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.	
Standard wall mounting bracket	7ME5933-0AC04	
Special wall-/pipe mounting bracket kit	7ME5933-0AC05	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	10

#### **Process Device Manager SIMATIC PDM**

#### SIMATIC PDM

Details about the SIMATIC PDM tool can be found on page 8/11, chapter "Communication and Software" See page 8/18, chapter "Communication and Software"



HART modem for communication with FUS060 HART, PC and SIMATIC PDM

#### **HART** modem

With USB connection

7MF4997-1DB

#### Spare parts

SITRANS FUS060 transmitter, available standard and Ex versions

The transmitter configuration is made in the flowmeter Order codes (together with the sensors). The information below is for spare part ordering only and with fixed standardized pre-settings for a DN 2000 2-path system.

Description	Version	Enclosure	Supply	Article No.	
FUS060, 230 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 230 V AC 50/60 Hz	7ME3050-2BA10-1BA1	
FUS060, 230 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 230 V AC 50/60 Hz	7ME3050-2BA10-1BA2	
FUS060, 230 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 230 V AC 50/60 Hz	7ME3050-2BA10-1DA1	ed ale
FUS060, 230 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 230 V AC 50/60 Hz	7ME3050-2BA10-1DA2	
FUS060, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 30 V DC/ 21 26 V AC	7ME3050-2BA20-1BA1	
FUS060, 24 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 30 V DC/ 21 26 V AC	7ME3050-2BA20-1BA2	
FUS060, 24 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 30 V DC/ 21 26 V AC	7ME3050-2BA20-1DA1	
FUS060, 24 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 30 V DC/ 21 26 V AC	7ME3050-2BA20-1DA2	
FUS060, ATEX, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4) ATEX approval	19 30 V DC/ 21 26 V AC	7ME3050-2BA21-1CA1	

# Transmitter SITRANS FUS060

Description	Article No.		Description	Article No.	
Operating/Display module	7ME5933-0AC00	The same of the sa	M20 cable gland set for FUS060 ATEX version power and output connection, PA plastic, 1 x in blue (ATEX Ex i) and 1 x gray (ATEX Ex-e) • cables Ø 5 9 mm (0.20" 0.35") • -20 +95 °C (-4 +203 °F)	A5E02246356	
Electronics cover with glass plate (non Ex) . Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC01		1/2" NPT cable gland set for FUS060 (NPT) power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 12 mm (0.24" 0.47") • -40 +100 °C (-40 +212 °F)	A5E02246396	
Cover for sensor cable and gasket. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC02		M25 cable gland set for the FUS060 PA (M25) power and output connection, gray PA plastic, 2 pcs.  • cables Ø 9 16 mm	A5E02246378	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC03		(0.35" 0.63")  • -40 +100 °C (-40 +212 °F)  M16x1.5 cable gland set for FUS060 (M16) sensor connection, gray PA plastic, 2 pcs. and 2 pcs. blind. • cables Ø 5 9 mm	A5E02593526	
FUS060 Sensor connection PCBA, Standard versions only, 1 pc.	A5E02551331		(0.20" 0.35") • -40 +100°C (-40 +212 °F) M16 x 1.5 cable gland set for	A5E02246369	
FUS060 Sensor connection PCBA, ATEX version only, 1 pc.	A5E02551334		FUS060 (M16) sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 9 mm (0.20" 0.35") • -20 +105°C (-4 +221 °F)		
M20 cable gland set for FUS060 (M20) power and output connection, gray PA plastic, 2 pcs.  • cables Ø 6 12 mm (0.24" 0.47")  • -40 +100 °C (-40 +212 °F)	A5E02246350		½" NPT cable gland set for FUS060 (NPT) sensor connection, 4 pcs. M16 bush to ½" NPT and 4 pcs. ½" NPT gray PA plastic glands • cables Ø 5 9 mm (0.20 0.35") • -20 +100 °C (-4 +212°F)	A5E02247877	

SITRANS F US Inline

# Transmitter SITRANS FUS060

# Cables for FUS060

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC)	3 (9.84)	A5E00875101	
(2 pcs.)	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.70)	A5E01278698	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. trans-	3 (9.84)	A5E00875105	
ducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 $\Omega$ )	15 (49.21)	A5E00861435	
omb plug, max. 70°0 (100°1), (impedante 70°22)	30 (98.43)	A5E01196952	
Special coaxial cable sets for low temperature cryogenic systems; with SMB plug	10 (32.84)	A5E02085593	
for transmitter SITRANS FUS060, PTFE material, temp200 +200 °C (-328+392 °F), impedance 75 Ω (2 pcs.)	15 (49.21)	A5E03262088	
( 020 17002 1 ), impodunoc 70 32 (2 pos.)	30 (98.43)	A5E02085644	
	40 (131.23)	A5E02085649	

#### **Transmitter SITRANS FUS080/FUE080**

#### Overview



SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flowmetering with any sensor in the FUS inline series SONOKIT, FUS380 and FUE380 up to DN 1200.

The ultrasonic flowmeter transmitter SITRANS FUS080 comes as battery or mains powered version. The SITRANS FUS080 is designed to measure flow water applications.

The SONOKIT retrofit flowmeter series are shown from page 3/273. The standard flowmeter series SITRANS FUS380 is described from page 3/284. The type approved flowmeter series for flowmetering in energy meter custody transfer systems are named SITRANS FUE380 - see page 3/289.

#### Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- · IrDA optical interface for local communication
- · 2-path measuring principle for optimum accuracy
- · Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- · Long-term stability
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q<sub>i</sub> (min): Q<sub>s</sub> (max) up to 1:400

#### Application

The main application for flowmeters with the transmitter SITRANS FUS080 is measurement of water flow in district heating plants, local networks, boiler stations, substations, chiller plants, irrigations plants and other general water applications.

#### Design

The transmitter type SITRANS FUS080 is designed with fiber-glass reinforced polyamide enclosure for remote or compact installation in normal areas. The remote versions are available with up to 30 meter distance from flowmeter to transmitter. When ordering as a compact version in the series FUS380 and FUE380 the transducer cables are pre-mounted at the sensor.

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- SONOKIT (1-path or 2-path)
- FUS380 (2-path)
- FUE380 (2-path)

The transmitter FUS080 is always ordered as part of a complete flowmeter system.

It can be manually ordered separately as spare part preprogrammed with the given sensor data.

#### Integration

The flowmeter pulse output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two pulse outputs, with functions that can be individually selected.

The settings of the transmitter, eg. flow and pulse output rate, are defined when ordering the complete flowmeter.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except eventually local approvals on the flowmeter.

#### Technical specifications

recimical specifications	
Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic trans- ducers in the sensor pipes.
	Supporting of 1-path or 2-path sensors in sizes DN 50 1200 measuring on water.
Measuring rate	
Battery mode	0.5 Hz
<ul> <li>Mains supply</li> </ul>	Up to 15 Hz
Back-up mode	0.5 Hz (at mains supply drop)
Flow rate	0.02 9 m/s (0.065 29.5 ft/s), bidirectional flow metering
Output	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ±35 V AC/DC, max. 50 mA
Max. pulse frequency	100 Hz at Q <sub>s</sub> (Q <sub>max)</sub>
Pulse value and length	Selectable with the ordering of the flowmeter
Output A function	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B function	Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indi- cation (preset: alarm)
Pulse value A and B	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m³/p, 2.5 m³/p, 5 m³/p, 10 m³/p, 25 m³/p, 50 m³/p, 100 m³/p, 250 m³/p, 500 m³/p, 1 000 m³/p
Pulse length (depending on $\mathbf{Q}_{\text{max}}$ by DN selection)	5, 10, 20, 50, 100, 200, 500 ms (standard 5 ms)
Alarm indication	Path 1 (F1), path 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), Q <sub>max</sub> overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)

#### SITRANS F US Inline

#### **Transmitter SITRANS FUS080/FUE080**

Transmitter STIRANS FUSUS	30/FUE080
Rated operation conditions	
Ambient conditions	
Ambient temperature	
Operation	-10 +60 °C (14 140 °F) (MID version: max. +55 °C (131 °F))
• Storage	-40 +85 °C (-40 +185 °F) (battery included)
Enclosure rating	IP67/NEMA 4X/6 to EN 60529 and DIN 40050
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Immunity	To EN/IEC 61326-1 (Industry)
• MID approved (FUE380 series)	Environment class E2 and M1
Mechanical vibration	2 g, 1 800 Hz sinusoidal in all directions according to IEC 68-2-6
Weight of transmitter	Approx. 1.5 kg (3.3 lb)
Design	
Enclosure material	Fibre-glass reinforced polyamide, light gray color
Wall mounting kit	IP67/NEMA 4X/6 terminal box for the wall mounting of the transmitter, fiber-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 2 M20 or PG 13.5 for power supply and outputs and 2 x M20 or PG 13.5 for the sensor cables, glands (supply and outputs and double cable entries for sensor cables) are included.
Sensor cable	Coaxial cable sets for remote transmitter up to 30 m (98.4 ft) long transducer cable, 75 $\Omega$ impedance, cables sets are prepared for the connection to the sensors
Display and controls	
Display	LCD, 8 digits, additional 2 digits and symbols for status information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Display setting	Flow unit: Preset: m <sup>3</sup> /h Volume unit: Preset: m <sup>3</sup>
Push button	One push button for menu selection and display information
Communication (IrDA optical eye)	IrDA – optical communication and control interface with Modbus RTU protocol for read or write transmitter settings and data via PC and PDM tool
Power supply	
Battery	D-cell battery pack, 3.6 V LiSOCI (Lithium Thionyl Chloride, 32 Ah), replaceable, life- and working-time up to 6 years
Mains	87 265 V AC (50 60 Hz) or
	87 265 V AC (50 60 Hz) with D-cell single battery backup, 2.6 V LiSOCI (Lithium Thionyl Chloride, 12.5 Ah), replaceable, life time up to 8 years
Power consumption	

#### SONOKIT, FUS380, FUE380

The flow values and settings are predefined according to dimension selection.

The transmitter settings are changeable by using the SW tool PDM (for FUE380 series some of the setting are only readable. restriction of the approval requirements).

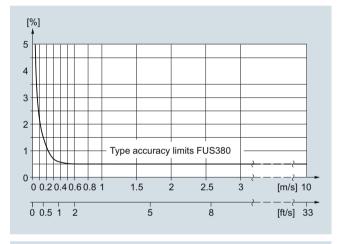
#### Accuracy/Error in measurement:

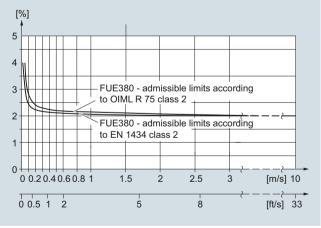
(at reference conditions for FUS380 and FUE380 series. SONOKIT series will differ in the accuracy)

- Pulse output

  - $\leq \pm 0.5$  % of measured value at 0.5 ... 10 m/s or  $\leq \pm 0.25$ /V [m/s] % of measured value at flow < 0.5 m/s
- Repeatability ≤ 0.25 % of measured value at 0.5 ... 10 m/s
- Reference conditions
  - Process temperature and ambient temperature: 25 °C  $\pm$ 5 °C (77 °F  $\pm$ 9 °F)

  - Transmitter warming-up time 30 min.
     Installation conditions of the sensor: Upstream section > 10 x DN and downstream section > 5 DN



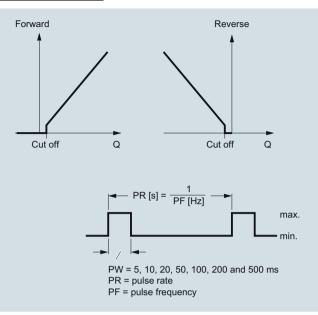


Mains version

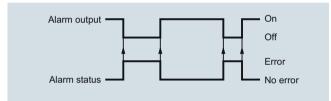
Approx. 2.5 VA

# Transmitter SITRANS FUS080/FUE080

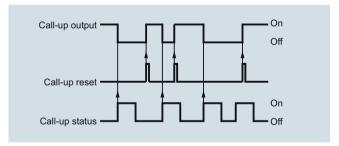
#### Output configuration



Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (via PDM software).



Pulse output B can be used as stated above or as alarm or call-up function.



Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.

#### Sensor coaxial cable for SONOKIT series with FUS080

# Coaxial cable Standard coaxial cable (75 Ω) Outside diameter Ø 5.8 mm Length 15, 30 m (49.2, 98.4 ft) between sensor and transmitter Material (outside jacket) Black PE Ambient temperature -10 ... +70 °C (14 ... 158 °F)

Sensor coaxial cable for FUS380/FUE 380 series		
Coaxial cable		
High temperature coaxial cable (75 $\Omega$ )	With special designed glands for connection in the sensor/transducer	
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter – black holt melt junction part between (Ø 16 mm, length 70 mm)	
Length	Up to 30 m (98.4 ft) between sensor and transmitter	
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)	
Ambient temperature	-200 +200 °C (-328 +392 °F) (brown PTFE trans- ducer part) and -10 +70 °C (14 158 °F) (black PE for remaining transmit-	

ter cable part)

SITRANS F US Inline

#### **Transmitter SITRANS FUS080/FUE080**

#### Transmitter FUS080 operating instructions, accessories and spare parts

#### Operating instructions

Description	Article No.	
for use with SONOKIT • English	A5E03059912	
integrated in FUS/FUE380 • English • German • Spanish • French	A5E00730100 A5E00740611 A5E00754188 A5E00754173	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature. All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.	
Sun lid for FUS080 transmitter (frame and lid)	A5E02328485	SIEMENS
Brace (holder) for optical IrDA eye	A5E00695277	S. r
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	FDK:087L4163	

#### **Process Device Manager SIMATIC PDM**

#### SIMATIC PDM

Details about the SIMATIC PDM tool can be found on page 8/11, chapter "Communication and Software"

See page 8/18, chapter "Communication and Software"



#### Spare parts

A spare part transmitter can be ordered for a specific system. In the description of the following spare part transmitters the related transmitter Article No. found on the device silver front label is noted.

# Spare part transmitter for FUS380 systems (7ME3400)

opare part transmitter for ros	occo dysterno (	7 WIES 1887
Description	Article No.	
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E02729700	
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series <sup>1)</sup> . Transmitter Article No. 7ME3450-0AA20-2AA0	A5E02729035	
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AA0	A5E02699309	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flow- meter series. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E02729610	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3400-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

#### Spare part transmitter for FUE380 approved systems (7ME3410)

(only with MID approval marks, no MID verification – only a complete flowmeter can be MID-verified, i.e. sensor together with the transmitter)

Description	Article No.	
FUE080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flow- meter series. Transmitter Article No. 7ME3450-0AA10-2AB0	A5E02734600	
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter serie.s <sup>1)</sup> . Transmitter Article No. 7ME3450-0AA20-2AB0	A5E02734568	
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	A5E02734539	
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	A5E02734585	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

#### Spare part transmitter for SONOKIT systems (7ME3210/7ME3220)

Description	Article No.	
FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E03048726	
FUS080 transmitter 3.6V battery (battery included) as spare part transmitter for SONOKIT flowmeters <sup>1)</sup> . Transmitter Article No. 7ME3450-0AA20-2AA0	A5E03048714	
FUS080 transmitter 230V mains as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA30-2AA0	A5E03048701	
FUS080 transmitter 230V mains with backup-battery as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E03048719	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3220-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

# **Transmitter SITRANS FUS080/FUE080**

# Spare part transmitter for FUS880 retrofitting systems (7ME3440)

Spare part transmitter for FU  Description	Article No.		Description	Article No.	
Sparepart FUS080 transmitter 3.6 V, incl. 3.6V dual batterie pack, USA ver- sion	A5E03412669		Internal battery pack, one set of 2 D-cell (3.6 V 33 Ah) <sup>1)</sup> • 1 pc. pack • 24 pcs. pack	A5E02679676 A5E02896941	Lithuas bidings Frame group dis
Transmitter Article No.: 7ME3450-0AA20-1CA0: Label, 0:					d year
Siemens FUS080 transmitter; Version, 0: Without connection box; Enclosure, A: IP67/NEMA 4X/6; Code A: Standard; Supply Voltage, 2: 3.6V DC battery;			Single battery back-up to main supply (13.5 Ah) <sup>1)</sup>	A5E02679923	
Ex. Approval, 0: no Ex approval; Display, 1: With display and unit label; Region version, C: USA: ACE, CFS;			Battery cover for transmitter FUS080	A5E00694468	
Application, A: Standard FUS080 (for SITRANS Retrofit - 7ME344); Code, 0: Standard			PG 13.5 cable gland set for FUS080 power and output connection, black PA plastic, 2 pcs.	FDK:083G0228	Ň
FUS080 transmitter for FUS880 retrofit systems, USA version,	7ME3440- 0AA01-2DA4		• cables Ø 6 12 mm (0.24" 0.47") • -40 +100 °C		""
incl. wall-mounting kit, 2 transducers and 2 pcs. 60 ft (20 m) of cables.		mental 22 Proper Constant of the constant of	(-40 +212 °F) PG 13.5 cable gland set (two cable entries) for FUS080	A5E00694500	
Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None;			sensor connection, black PA plastic, 2 pcs.  • cables Ø 6 12 mm		
Pipe Material, 0: No Pipe; Track configuration, 1: 1-Track;			(0.24" 0.47") • -40 +100 °C (-40 +212 °F)		
Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080,IP67, Battery, Remote, unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland			SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 DN 1200/2" 48")	A5E00694509	4
FUS080 transmitter for FUS880 retrofit systems, USA version,	7ME3440- 0AA03-2DA4				
incl. wall-mounting kit, 4 transducers and 4 pcs. 60 ft (20 m) of cables: Label, 0:			SITRANS FUS/FUE380 termi- nal box for compact transmitter mounting, including connec- tion plate, (bronze sensors only, DN 50 DN 80/2" 3")	A5E01208138	
Eabel, 0. Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Wall Phickness, A: None; Pipe; Track configuration, 3: 2-Track (X-Configuration);			SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 DN 1200/4* 48*)	A5E00694660	
Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080, IP67, Battery, Remote, unit label;			FUS080 display and keypad	A5E00873496	
Template, A: None; Transducer coax cable, 4: 20 m with gland					

Lithium batteries are subject to special transportation regulations according to United Nations 'Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Downloads for DEVICE description FUE380 http://support.automation.siemens.com/WW/view/en/23036121/133100

SITRANS F US Inline

#### **Transmitter SITRANS FUS080/FUE080**

#### Sensor cables for FUS380/FUE380 flowmeters

#### Description Article No. DN 50 to 80 flowmeters Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 $\Omega$ 5 m (16.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") A5E01208092 remote mounting 10 m (32.8 ft) cable set A5E01208114 (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting 20 m (65.6 ft) cable set A5E01208117 (4 pcs.) for DN 50 ... DN 80 (2"'... 3") remote mounting 30 m (98.4 ft) cable set A5E01208121 (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting A5E01208126 0.5 m (1.64 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") for compact version of FUS380/FUE380 DN 100 to 1200 flowmeters Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 $\Omega$ 5 m (16.4 ft) cable set (4 pcs.) **A5E00695476** for DN 100 ... DN 1200 (4" ... 48") remote mounting 10 m (32.8 ft) cable set A5E00695479 (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting 20 m (65.6 ft) cable set A5E00695480 (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting 30 m (98.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 A5E00695483 (4" ... 48") remote mounting 1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") for compact version A5E00695486 of FUS380/FUE380

Sensor cables for SONOKIT flowmeter with FUS080

Description	Article No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478541	
30 m (98.4 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478751	

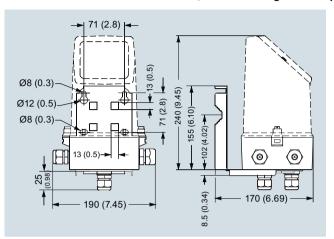
Sensor cables for FUS880 retrofitting systems (7ME3440)

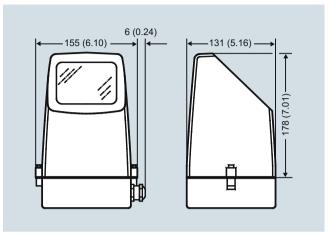
Description	Article No.	
Coaxial cable with trans- ducer connection		
for use in FUS880 and SONO 3300 sensors; with 0.3 m brown PTFE high temperature transducer part, max. 200 °C (392 °F) and black PVC for the remaining transmitter part, max. 70 °C (158 °F); cable impedance 75 $\Omega$ .		
• 1 x 10 m (32.8 ft)	FDK:085L2400	
• 1 x 20 m (65.6 ft)	FDK:085L2401	
• 1 x 30 m (98.4 ft)	FDK:085L2402	
Transducer spare part set of two transducers with gas- kets for STRANS FUS880 retrofitting systems	FDK:087H3007	99

# **Transmitter SITRANS FUS080/FUE080**

# Dimensional drawings

# FUS080 transmitter IP67/NEMA 4X/6, wall mounting and compact mounting

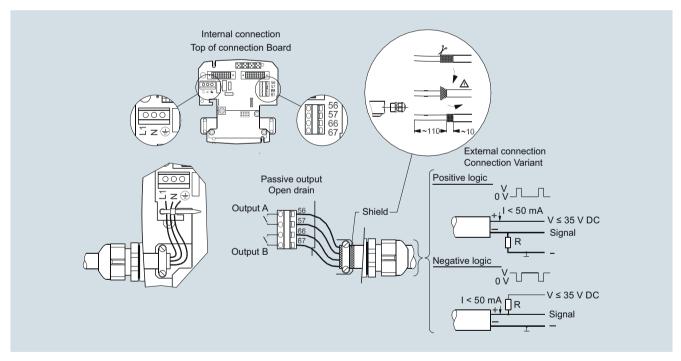




Transmitter wall mounted, dimensions in mm (inch)

Transmitter compact mounted, dimensions in mm (inch)

#### Schematics



Electrical connection of SITRANS FUS080

SITRANS F US Inline

#### Flowmeter SONO 3300/FUS060

#### Overview



The combination of SONO 3300 sensor and FUS060 transmitter is ideal for applications within the general industry. Measurements are independent of liquid temperature, density, pressure and conductivity. Transducers cannot be replaced.

#### Benefits

- Robust remote transmitter FUS060
- Robust design for industrial applications
- Measures all liquids less than 350 cSt, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- · Long-time stability
- ATEX approval

#### Application

The main application for SONO 3300/FUS060 ultrasonic flow-meter is measurement of volume.

SONO 3300/FUS060 can be used for water and treated waste water, oil, hot water/cooling systems.

#### Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 80 (2" to 3")), welded pipes (DN 100 to 300 (4" to 12")) and a transmitter FUS060.

The transmitter can only be mounted separately.

The internal signal cables from transducers to sensor connection box are protected from an aggressive environment by stainless steel pipes.

#### Sensor installation

See system information.

# Technical specifications

The transmitter related to this system is the SITRANS FUS060.

Technical specifications to the FUS060 see page 3/245.

2-path sensor with flanges and in	line transducers
Error in measurement	
Error in measurement at reference conditions	$v > 0.510$ m/s, $< \pm 0.5$ % of rate (v=flow speed)
Max. flow velocity	10 m/s (32 ft/s)
Nominal size	DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300 (2" 12")
Media temperature	Separate version: -10 +160 °C (14 320 °F)
Ambient temperature (sensor)	Separate version: -20 +60 °C (-4 +140 °F)
	Storage: -40 +85 °C (-40 +185 °F)
Enclosure	Standard version: IP67 (NEMA 4X/NEMA 6)
	ATEX version: As standard, but with ATEX approval (see below)
Process connections	
PN designated EN 1092-1, type 11 (B)	• DN 50 300 (2" 12"), PN 40
	• DN 100 300 (4" 12"), PN 16
	• DN 200 300 (8" 12"), PN 10
Class designated EN 1759-1	• DN 50 300 (2" 12"), class 150
	• DN 50 300 (2" 12"), class 300
Transducer	Inline version welded into pipe
Materials	
Pipe	• DN 50 80 (2" 3"): Cast steel EN 1.1131-GS-15Mn5
	• DN 100 300 (4" 12"): Carbon steel EN 1.0345-P235GH
Flange	• DN 50 300 (2" 12"): EN 1.0025-S235JRG2
Class	ASTM A105
Transducer	Stainless steel AISI 316 or similar

# Flowmeter SONO 3300/FUS060

The devices are supplied as stan- dard with a Siemens Certificate of Conformity on CD
Material certificate according to EN 10204-3.1 is optionally available
Extended material certificate is available on request
A standard calibration report is shipped with each flowmeter.
Optionally available
No custody transfer approvals
System ATEX approval for SONO 3300 with remote transmit- ter FUS060-Ex (ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3)
For Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements.

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

# Coaxial cable between sensor SONO 3300 and transmitter FUS060

Standard Coaxial cable (75 $\Omega$ )	Coaxial cable with SMB straight plug on one end for the FUS060 connector	
Outside diameter	Ø 5.8 mm	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter	
Material (outside jacket)	black PE	
Ambient temperature	-10 +70 °C (14 158 °F)	
High temperature Coaxial cable (75 $\Omega$ )	Coaxial cable with SMB straight plug on one end for the FUS060 connector	
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sen- sor and transmitter (max. 3 m (9.84 ft)) transducer cable length for Ex area mounted transmitters)	
Material (outside jacket)	Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remain- ing cable)	
Ambient temperature	-200 +200 °C (-328 +392 °F) (brown PTFE trans- ducer part) and -10 +70 °C (14 158 °F) (black PE for remaining transmit- ter cable part)	

SITRANS F US Inline

# Flowmeter SONO 3300/FUS060

Selection and Ord	lering data	Artic	le No	o. O	rder	cod	е
Sensor SONO 330 transmitter FUS06		7 M E	3 3 (	0 -			
transmitter F0300	<b>50</b>		0 -				
	icle No. for the online con- PIA Life Cycle Portal.						
Diameter	Qn setting [m <sup>3</sup> /h]						
DN 50 (2")	10	1 A					
DN 50 (2") DN 50 (2")	26 60	1 B 1 D					
DN 65 (2½")	15	1 E					
DN 65 (2½")	42	1 F					
DN 65 (2½")	100	1 H					
DN 80 (3") DN 80 (3")	20 60	1 J 1 K					
DN 80 (3")	150	1 M					
DN 100 (4") DN 100 (4")	36 100	1 N 1 P					
DN 100 (4")	230	1 R					
DN 125 (5")	50	1 S					
DN 125 (5") DN 125 (5")	150 360	1 T 1 V					
DN 150 (6")	80	2 A					П
DN 150 (6")	220	2 B					ľ
DN 150 (6") DN 200 (8")	500 120	2 D 2 E					
DN 200 (8")	380	2 F					
DN 200 (8")	900	2 H					
DN 250 (10") DN 250 (10")	200 600	2 J 2 K					
DN 250 (10")	1400	2 M					
DN 300 (12") DN 300 (12")	300 850	2 N 2 P					
DN 300 (12")	2200	2 R					
Flange norm and	pressure rating vailable in all pressure						
ratings)	valiable iii ali pressure						
EN 1092-1	200 (0   40  ))						
PN 10 (DN 200 30 PN 16 (DN 80 30		B C					
PN 40 (DN 50 30		E					
ANSI B16.5 class 150 (DN 50.	200 (2" 12"))	н					
class 300 (DN 50 .		J					
Sensor type (appropriate type)	roval) and transmitter						
IP67 standard, rem	note transmitter		1				
IP67 Ex-version (A	ΓΕΧ), remote transmitter		3				
(Ex-version)  Cable gland entrice	es in FUS060 and						
SONO 3300							
Cable glands M20 transmitter M25/20				1			
	on of SITRANS FUS060			, .			
IP65 (NEMA 4), 12 IP65 (NEMA 4), 24	V AC/DC			N P			
	V AC/DC, Ex-version			Q			
,							

Selection and Ordering data	Article No. Order code				
Sensor SONO 3300 with	7ME3300-				
transmitter FUS060	0				
FUS060 output module HART, 4 20 mA, 1 pulse output, 1 relay HART, Ex version, 4 20 mA, 1 pulse output, 1 relay	B C				
PROFIBUS PA, 1 pulse/frequency	D				
Transducer coaxial cable 4 x 3 m, max. 70 °C (158 °F), the only option for Ex i 4 x 15 m, max. 70 °C (158 °F) 4 x 30 m, high temp. max.200 °C (392 °F) 4 x 30 m, max. 70 °C (158 °F)	0 1 2 3				
4 x 60 m, max. 70 °C (158 °F) 4 x 90 m, max. 70 °C (158 °F) 4 x 120 m, max. 70 °C (158 °F)	4 5 6				
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i 4 x 15 m, high temp. max. 200 °C (392 °F)	7 8				

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 50 DN 300 (with certificate, 2 x 3 points in 10 %, 25 % and 100 % Qn)	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 to DN 200 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5%, 10 %, 25 %, 50% and 100 % Qn (max. flow 630 m <sup>3</sup> /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 300 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2000 m <sup>3</sup> /h).	D21
Material certificate	
EN 10204-3.1	F10
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	Y17



Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

Flowmeter SONO 3300/FUS060

# Flowmeter SONO 3300 with FUS060 operating instructions, accessories and spare parts

Operating instructions

operating metraetione		
Description	Article No.	
SITRANS FUS060		
• English	A5E01204521	
• German	A5E02123845	
SITRANS F US SONO 3300		
• English	A5E01365400	
German	A5E02690975	
<ul><li>Spanish</li></ul>	A5E02690992	
• French	A5E02690987	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:

http://www.siemens.com/flowdocumentation

#### Accessories

Potting kit

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403	

#### Cable connection boxes

(Optional for the connection of individually transducer cables with the FUS060 transducer cables)

Description	Article No.	
Junction box for coaxial cable		
IP68 metal box for 4 coaxial cables	FDK:085B1361	0000

#### Spare parts

Cables for SONO 3300 with FUS060 (only as spare parts)

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.70)	A5E01278698	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. trans-	3 (9.84)	A5E00875105	
ducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 $\Omega$ (2 pcs.)	15 (49.21)	A5E00861435	
(	30 (98.43)	A5E01196952	

#### Cable glands (for the SONO 3300 terminal box) (only as spare parts)

Туре	Material	Temperature range [°C (°F)]	Article No.	
M20	Nickel-plated brass, 2x cables Ø 5 6 mm (2 pcs.)	-25 +200 (-13 +392)	A5E02246329	

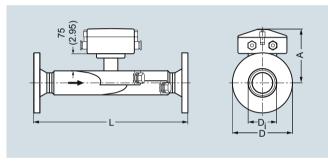
# SITRANS F US Inline

# Flowmeter SONO 3300/FUS060

Description	Article No.	
SONO 3300 terminal box lid, in stainless steel painted black (1 pc.)	FDK:085U1505	
Gasket for SONO 3300 terminal lid in EPDM (1 pc.)	FDK-085U1820	

Description	Article No.	
SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version, incl. lid in stainless steel (painted black) and gasket in EPDM	A5E00836867	<b>S</b>
Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060	A5E02593568	10 to 10 10 14 10

# Dimensional drawings



Sensor SONO 3300, dimensions in mm (inch)

DN	EN 10	92-1																
	PN 10					PN 16	PN 16					PN 40						
	L <sup>1)</sup>		D		Di		L <sup>1)</sup>		D		Di		L <sup>1)</sup>		D		Di	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50													475	18.70	165	6.50	52.60	2.07
65													475	18.70	185	7.28	62.70	2.47
80							380	14.96	200	7.87	78.00	3.07	400	15.75	200	7.87	78.00	3.07
100							375	14.76	220	8.66	102.40	4.00	400	15.75	235	9.25	102.40	4.00
125							375	14.76	250	9.84	128.30	5.05	400	15.75	270	10.63	128.30	5.05
150							360	14.17	285	11.22	154.20	6.07	400	15.75	300	11.81	154.20	6.07
200	400	15.75	340	13.39	207.30	8.16	400	15.75	340	13.39	207.30	8.16	450	17.72	375	14.76	206.50	8.13
250	400	15.75	395	15.55	260.40	10.25	400	15.75	405	15.94	260.40	10.25	500	19.69	450	17.72	258.80	10.19
300	400	15.75	445	17.52	309.70	12.19	420	16.54	460	18.11	309.70	12.19	500	19.69	515	20.28	307.90	12.12

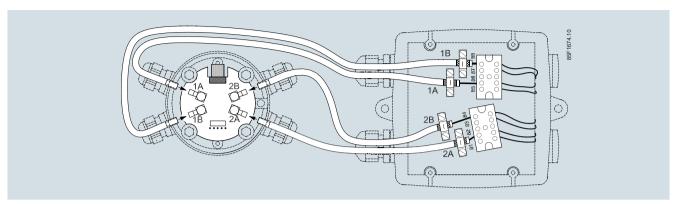
DN	ANS	ANSI												Weig	ht <sup>2)</sup>			
	150 I	150 lb				300 lb					EN a	nd ANSI	EN		ANS	l		
	L <sup>1)</sup>		D D <sub>i</sub>			L <sup>1)</sup>		D D <sub>i</sub>		A								
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lb	kg	lb
50 mm/2"	510	20.08	152	5.98	52.6	2.07	520	20.47	165	6.50	52.6	2.07	180	7.09	14	30.9	17	37.5
65 mm/21/2"	510	20.08	178	7.01	62.7	2.47	520	20.47	190	7.48	62.7	2.47	186	7.32	16	35.3	20	44
80 mm/3"	420	16.54	191	7.52	78.0	3.07	440	17.32	210	8.27	78.0	3.07	193	7.60	19	42	23	51
100 mm/4"	420	16.54	229	9.01	102.4	4.03	440	17.32	254	10	102.4	4.03	205	8.07	25	55	35	78
125 mm/5"	440	17.32	254	10.00	128.3	5.05	460	18.11	279	10.98	128.3	5.05	218	8.58	29	64	40	89
150 mm/6"	430	16.93	279	10.98	154.2	6.07	450	17.71	318	12.52	154.2	6.07	232	9.13	35	78	50	111
200 mm/8"	480	18.90	343	13.50	202.7	7.98	500	19.69	381	15	202.7	7.98	256	10.08	54	119	72	160
250 mm/10"	490	19.29	406	15.98	254.5	10.02	520	20.47	444	17.48	254.5	10.03	283	11.14	85	189	98	217
300 mm/12"	550	21.65	483	19.02	306.3	12.06	580	22.83	521	20.51	306.3	12.06	309	12.17	115	256	142	322

 $<sup>^{1)}</sup>$  Length tolerance (mm): DN 50 ... 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 300 +4/-5

 $<sup>^{2)}</sup>$  Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb)

Flowmeter SONO 3300/FUS060

# Schematics



Electrical connection of SITRANS FUS060 and SONO 3300

SITRANS F US Inline

#### Flowmeter SONO 3100/FUS060

#### Overview



The combination of the SONO 3100 sensor and the FUS060 transmitter is ideal for applications where process shut-down is impossible during service and where there is a need for extreme high/low temperatures and pressures.

Transducers can be changed without interrupting operation. SONO 3100 can optionally be delivered as a 4-path solution for absolute best performance and accuracy.

#### Benefits

- Transducers can be replaced under pressure
- Measurement of all liquids less than 350 Cst, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- · Long-time stability
- On request as special versions:
  - Special sensor material, e.g. Duplex, stainless steel
  - High/low temperature sensor version: +250 °C (+482 °F)/ -200 °C (-328 °F) sensors
  - Pressure rating 430 bar (6235 psi)
  - Special sensor sizes down to DN 25
  - 1-path or 4-path sensor technology

# Application

The main application for SONO 3100 in combination with transmitter type FUS060 is to measure volume flow within:

- · Petrochemical industry
- · Power engineering
- · Water and waste water
- · Oil and liquefied gases

SITRANS FUS060 holds ATEX for hazardous areas, HART and PROFIBUS PA. SONO 3100 holds ATEX Ex approval.

# Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, SONO 3200 transducers with O-rings or flanges depending on selection - and a FUS060 transmitter. SONO 3100 is basically supplied in a 2-path solution with flanges in sizes from DN 100 to DN 600 and without flanges in sizes from DN 100 to DN 300.

1-path or 4-path special versions are avaible on request, depending on size (DN 25 to DN 4000).

SONO 3100 is as standard available in carbon steel from DN 100 to DN 600.

FUS060 is designed for remote wall mounting only.

2-path sensor fitted with four SONO 3200 transducers

#### Technical specifications

The transmitter related to this system is the SITRANS FUS060. Technical specifications to the FUS060 see page 3/245.

-	
Error in measurement	
Error in measurement at reference conditions	$v > 0.5 \dots 10$ m/s, $< \pm 0.5$ % of rate (v=flow velocity)
Max flow velocity	10 m/s (32 ft/s)
Nominal size	DN 100 600 (4" 24")
Media temperature	
Standard	-10 +200 °C (14 392 °F)
ATEX Ex d version	-20 +200 °C (-4 +392 °F)
ATEX Ex i version	-10 +200 °C (14 +392 °F)
• Specials	-200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature	
<ul> <li>Standard and Ex-i version</li> </ul>	-20 +60 °C (-4 +140 °F)
• Ex d version	-20 +180 °C (-4 +356 °F)
Enclosure	IP67 (NEMA 4X/6)/IP68 (NEMA 6P) and ATEX (see below)
Process connections	
PN designated, EN 1092-1,	
type 11 (B) Pipe material carbon steel	• DN 200 600 (8" 24"), PN 10 • DN 100 600 (4" 24"), PN 16
	• DN 100 600 (4" 24"), PN 16 • DN 200 600 (8" 24"), PN 25 • DN 100 500 (4" 20"), PN 40
Class designated, EN 1759-1	
Pipe material carbon steel	• DN 100 600 (4" 24") Class 150 • DN 100 300 (4" 12")
	Class 300
Without flanges (EN 10217), (weld-in version)	• DN 350 600 (14" 24"), PN 10 • DN 100 600 (4" 24"), PN 16
only in carbon steel	• DN 200 600 (8" 24"), PN 25 • DN 100 500 (4" 20"), PN 40
Transducer SONO 3200	O-ring or flange versions
Materials	
Pipe	Steel EN 1.0345-P235GH
Flange	
PN	EN 10025-S235JRG2, 1E1
Class	ASTM A105,1,1
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6

# Flowmeter SONO 3100/FUS060

ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3 or ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Exd transducers (for standard FUS060 transmitter, installed outside of Ex zone)
For FUS060 Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements for electrical immunity.
The devices are supplied as stan- dard with a Siemens Certificate of Conformity on CD
Material certificate according to EN 10204-3.1 is optionally available
Extended material certificate is optionally available
Pressure test according EN 1024-2.3 optionally available
A standard calibration report is shipped with each flowmeter.
Optionally available:
Extended accredited ISO/IEC 17025 calibration certificates
No custody transfer approvals

The sensor SONO 3100 with transmitter FUS060 conforms to Product Family Standard EN 61326/A3 appendix A (Title: Electrical Equipment for Measurement control and laboratory use – EMC requirements).

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

The SONO 3100 as weld-in version does not include the flanges. Thus, it can neither be tested nor approved according to PED. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

	1 lowilletel	30110 3100/1 03000
Selection and Order		Article No. Order code
SITRANS F US SON	O 3100 sensor	7ME3100-
2-path		
	e No. for the online con- A Life Cycle Portal.	
Diameter	Qn setting [m <sup>3</sup> /h]	
DN 100 (4")	28	1 N
DN 100 (4")	100	1 P
DN 100 (4")	220	1 R
DN 125 (5")	44	1 S 1 T
DN 125 (5") DN 125 (5")	150 350	1 V
DN 150 (6")	64	2 A
DN 150 (6")	220	2 B
DN 150 (6")	500	2 D
DN 200 (8")	110	2 E
DN 200 (8")	380	2 F
DN 200 (8")	900	2 H
DN 250 (10")	180	2 J
DN 250 (10") DN 250 (10")	600 1300	2 K 2 M
DN 300 (12")	250	2 N
DN 300 (12")	850	2 P
DN 300 (12")	2000	2 R
DN 350 (14")	350	2 S
DN 350 (14")	1000 2800 <sup>1)</sup>	2 T
DN 350 (14")		2 V
DN 400 (16") DN 400 (16")	450 1300	3 A 3 B
DN 400 (16")	3600	3 D
DN 500 (20")	1300	3 J
DN 500 (20")	2200	3 K
DN 500 (20")	4200 <sup>1)</sup>	3 M
DN 600 (24")	1300 3200	3 S 3 T
DN 600 (24") DN 600 (24")	4200 <sup>1)</sup>	3 V
Flange norm and pr		
	lable in all pressure rat-	
EN 1092-1		
PN 10 (DN 200 DN	,	В
PN 16 (DN 100 DN		C D
PN 25 (DN 200 DN PN 40 (DN 100 DN		E
ANSI B16.5		
class 150 (DN 100 class 300 (DN 100		H H
Pipe without flanges		
version) <sup>2)</sup> PN 10 (DN 200 DN	I 600)	P
PN 16 (DN 100 DN		Q
PN 25 (DN 200 DN	I 600)	R
PN 40 (DN 100 DN	I 500)	S

# SITRANS F US Inline

# Flowmeter SONO 3100/FUS060

Selection and Ordering data	Article No. Order code
SITRANS F US SONO 3100 sensor	7ME3100-
2-path	
Pipe and flange material	
Carbon steel (DN 100 1200)	1
Transducer type and approval	
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 600)	1
IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 600)	2
IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 600)	3
IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 300)	4
IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) (DN 100 300)	5
IP68 SS housing, PN 40, flange, 88 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 300)	6
IP67 SS housing, PN 40, O-ring, 50 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 600)	7
IP67 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 300)	8
Cable gland entries	
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5	1
Cable glands $\frac{1}{2}$ " NPT in transducers and in transmitter	2
Transmitter version of SITRANS FUS060	
IP65 (NEMA 4), 120/230 V AC IP65 (NEMA 4), 24 V AC/DC IP65 (NEMA 4), 24 V AC/DC ATEX Ex version	N P Q
FUS060 output module	
HART, 1 pulse output, 1 relay HART Ex, 1 pulse output, 1 relay	B C
PROFIBUS PA, 1 pulse/frequency	D
Transducer coaxial cable	
$4 \times 3 \text{ m}$ , max. 70 °C (158 °F), the only option for Ex i	0
4 x 15 m, max. 70 °C (158 °F)	1
4 x 30 m, high temp. max. 200 °C (392 °F) 4 x 30 m, max. 70 °C (158 °F)	2 3
4 x 60 m, max. 70 °C (158 °F)	4
4 x 90 m, max. 70 °C (158 °F) 4 x 120 m, max. 70 °C (158 °F)	5
4 x 3 m, high temp. max. 200 °C (392 °F),	7
the only option for Ex i 4 x 15 m, high temp. max. 200 °C (392 °F)	8
·	

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

Selection and Ordering data	Order code
	0.00.000
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 100 DN 600 (with certificate)	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 100 to DN 200 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m³/h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2800 m <sup>3</sup> /h).	D21
Accredited Siemens ISO/IEC 17025 calibration for DN 400 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 8000 m <sup>3</sup> /h).	D22
Material certificate	
EN 10204-3.1	F10
EN 10204-3.1 and 100 % NDT on weldings, DN 100 DN 400	F11
EN 10204-3.1 and 100 % NDT on weldings,	F12
DN 500 DN 600	
Pressure certificate EN 10204-2.3	F21
Tag name plate	
<del></del>	Y17
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	11/



Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

Reduced Q value during calibration (Qn setting unchanged).
 For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du / Wxx > 100).

# Flowmeter SONO 3100/FUS060

# Flowmeter SONO 3100 with FUS060 operating instructions, accessories and spare parts

#### Operating instructions

· p · · · · J · · · · · · ·		
Description	Article No.	
SITRANS FUS060		
<ul> <li>English</li> </ul>	A5E01204521	
<ul> <li>German</li> </ul>	A5E02123845	
SITRANS F US SONO 3100		
• English	A5E00814513	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description
Potting kit for terminal box of
SONO 3200 transducer for
IP68/NEMA 6P
(not for Ex sensors)

Article No.



Description	Trans- ducer length	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F))	50 mm (1.97") trans- ducers	FDK:085B5331	

<u>Cable connection boxes</u> (For the connection of individually transducer cables with the FUS060 transducer cables)

Description	Article No.	
Junction box for coaxial cable		
• IP68 metal box for 4 coaxial cables	FDK:085B1361	
<ul> <li>IP68 EEx e plastic box for 4 coaxial cables, no ATEX ap- proval</li> </ul>	FDK:085B1363	

#### Spare parts

Transducer SONO 3200 spare parts, complete units

Туре	Material	Gasket	Press. rating	Terminal housing	Approv.	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 M20		-20 +100 (-4 +212)	50 (1.97)	FDK:085B5453	
O-ring	316 SS	O-ring	PN 40	316 SS M20		-20 +200 (-4 +392)	50 (1.97)	FDK:085B5450	A STATE OF THE PARTY OF THE PAR
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex d <sup>1)</sup>	-20 +200 (-4 +392)	50 (1.97)	FDK:085B5451	
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex i <sup>2)</sup>	-10 +200 (14 392)	50 (1.97)	A5E00836448	TO TO
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 1/2" NPT		-20 +100 (-4 +212)	50 (1.97)	A5E00839472	13
O-ring	316 SS	O-ring	PN 40	316 SS 1/2" NPT		-20 +200 (-4 +392)	50 (1.97)	A5E00839431	
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 M20		-20 +100 (-4 +212)	88 (3.47)	FDK:085B5461	
Flange	316 SS	Graphite	PN 40	316 SS M20		-20 +200 (-4 +392)	88 (3.47)	FDK:085B5462	B
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex d <sup>1)</sup>	-20 +200 (-4 +392)	88 (3.47)	FDK:085B5463	
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex i <sup>2)</sup>	-10 +200 (14 +392)	88 (3.47)	A5E00836465	1
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 1/2" NPT		-20 +100 (-4 +212)	88 (3.47)	A5E00839479	
Flange	316 SS	Graphite	PN 40	316 SS 1/2" NPT		-20 +200 (-4 +392)	88 (3.47)	A5E00839440	
Flange	316 SS	Copper ring	PN 40	316 SS PG13.5 (cryogenic version)		-200 +100 (-328 +212)	88 (3.47)	FDK:085B5416	
Flat flange	316 SS	Flat gasket	PN 40	316 SS M20 (cryogenic version)		-200 +100 (-328 +212)	88 (3.47)	A5E02593524	
Flange	316 SS	Graphite	PN 160	316 SS M20		-20 +180 (-4 +356)	88 (3.47)	FDK:085B5464	
Flange	316 SS	Graphite	PN 160	316 SS M20	Ex d <sup>1)</sup>	-20 +200 (-4 +392)	88 (3.47)	FDK:085B5465	

<sup>1)</sup> ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

 $<sup>^{2)}~</sup>$  For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

# SITRANS F US Inline

# Flowmeter SONO 3100/FUS060

# Terminal housing for SONO 3200 sensor

Туре	Pressure rating	Material	Temp. range [°C (°F)]	Article No.	
Terminal housing (M20 cable gland)	N/A	PA 6.6	-20 +100 (-4 +212)	FDK:085B5501	
Terminal housing (M20 cable gland)	N/A	ASTM 316	-20 +200 (-4 +392)	FDK:085B5504	
Terminal housing (1/2" NPT cable gland)	N/A	PA 6.6	-20 +100 (-4 +212)	A5E00839460	
Terminal housing (½" NPT cable gland)	N/A	ASTM 316	-20 +200 (-4 +392)	A5E00839427	
Ex d <sup>1)</sup> terminal housing (M20 cable gland)	N/A	ASTM 316	-20 +200 (-4 +392)	FDK:085B5505	
Ex i <sup>2)</sup> terminal housing (M20 cable gland)	N/A	ASTM 316	-10 +200 (14 392)	A5E00835255	

<sup>1)</sup> ATEX (Ex) IIC 2G EEx d IIC T3 ... T6

#### SONO 3200 spare parts, transducer body without terminal housing, including insert

Туре	Material	Gasket	Pressure rating	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	-20 +200 (-4 +392)	50 (1.97)	FDK:085B1405	
Flange	316 SS	Graphite	PN 40	-20 +200 (-4 +392)	88 (3.47)	FDK:085B1464	

#### SONO 3200 spare parts, transducer insert

Туре	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
Insert	-20 +200 (-4 +392)	50 (1.97)	FDK:085B1411	
Insert	-20 +200 (-4 +392)	88 (3.47)	FDK:085B1459	
				THE TOTAL PROPERTY OF THE PARTY

#### Transducer SONO 3200 gaskets

Туре	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for o-ring transducers)	PN 40	FKM	-20 +200 (-4 +392)	FDK:085B1089	8
Gasket flange	PN 40/160	Graphite	-20 +200 (-4 +392)	FDK:085B1080	
Gasket and 12 mm (0.47*) bolts and nuts for flange transducers	PN 40	Flat ring type	-20 +200 (-4 +392)	FDK:085B1083	
Gasket and 16 mm (0.63") bolts and nuts for flange transducers	PN 160	Graphite, 316 SS	-20 +200 (-4 +392)	FDK:085B1084	
Gasket for cryogenics transducer with flat flange (2 pcs.)	PN 40	Graphite/metal	-200 +100 (-328 +212)	A5E02593522	0

<sup>&</sup>lt;sup>2)</sup> For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

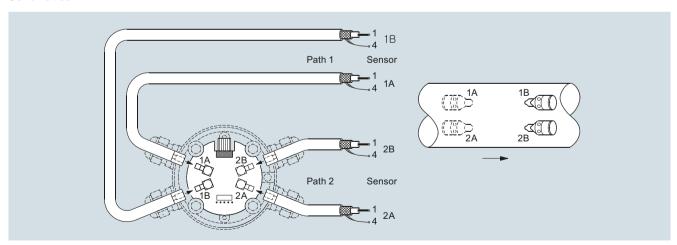
# Flowmeter SONO 3100/FUS060

SONO 3200	cable glands	<u>s</u>		
Type/des- cription	Tempera- ture range [°C (°F)]	Appr.	Article No.	
black PA plastic, cable Ø 5 13 mm	-20 100 (-4 +212)		A5E02246304	9
½" NPT gray PA plastic, cable Ø 5 9 mm	-20 100 (-4 +212)		A5E02246309	9
½" NPT crome- plated brass, cable Ø 5 9 mm	-40 100 (-40 +212)		A5E02246258	9
M20 stain- less steel, cable Ø 4 6 mm	-25 200 (-13 +392)	Exi	A5E02246194	
M20 Stain- less steel, cable Ø 5 8 mm	-60 180 (-76 +356)	Ex d	A5E02246311	

# Cables for SONO 3100 with FUS060

Description	Length m (ft)	Article No.					
Coaxial cable for	3 (9.84)	A5E00875101					
FUS060, (75 Ω, max. 70 °C (158 °F), black	15 (49.21)	A5E00861432					
PVC)	30 (98.43)	A5E01278662	. (				
(2 pcs.)	60 (196.85)	A5E01278682					
	90 (295.28)	A5E01278687					
	120 (393.7)	A5E01278698					
High temp. coaxial	3 (9.84)	(9.84) <b>A5E00875105</b>					
cable for FUS060; with 0.3 m brown	15 (49.21)	A5E00861435					
PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	30 (98.43)	A5E01196952					
SITRANS F US special coaxial	10 (32.84)	A5E02085593					
cable sets for low	15 (49.21)	A5E03262088					
temperature cryo- genic systems, with	30 (98.43)	A5E02085644					
SMB-plug for transmitter SITRANS FUS060, PTFE material, temp200 +200 °C (-328 +392 °F), impedance 75 $\Omega$ (2 pcs.)	40 (131.23)	A5E02085649					

# Schematics

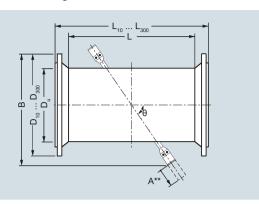


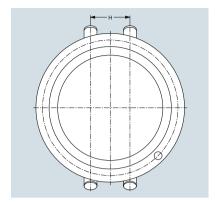
Electrical connection of SITRANS FUS060 and SONO 3100

SITRANS F US Inline

# Flowmeter SONO 3100/FUS060

# Dimensional drawings of sensor SONO 3100





#### Sensor SONO 3100 with EN norm

						PN 10			PN 16			PN 25			PN 40		
DN	D <sub>U</sub>	L <sup>1) 4)</sup>	B <sup>5)</sup>	θ	Н	W <sub>10</sub> <sup>2)</sup>	D <sub>10</sub>	L <sub>10</sub> 1)	W <sub>16</sub> <sup>2)</sup>	D <sub>16</sub>	L <sub>16</sub> 1)	$W_{25}^{2)}$	D <sub>25</sub>	L <sub>25</sub> 1)	W <sub>40</sub> <sup>2)</sup>	D <sub>40</sub>	L <sub>40</sub> 1)
	[mm]	[mm]	[mm]	[°]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
100	114.3	860	305	45 <sup>3)</sup>	42.8	-	-	-	3.6	220	960	-	-	-	3.6	235	990
125	139.7	862	325	45 <sup>3)</sup>	64.5	-	-	-	4.0	250	970	-	-	-	4.0	270	990
150	168.3	862	350	45 <sup>3)</sup>	78.1	-	-	-	4.5	285	970	-	-	-	4.5	300	1010
200	219.1	668	430	45 <sup>3)</sup>	102.1	6.3	340	790	6.3	340	790	6.3	360	820	6.3	375	840
250	273.0	714	480	45 <sup>3)</sup>	127.6	6.3	395	850	6.3	405	850	7.1	425	890	7.1	450	920
300	323.9	607	525	45 <sup>3)</sup>	151.8	7.1	445	740	7.1	460	760	8.0	485	790	8.0	515	830
350	355.6	639	550	45 <sup>3)</sup>	166.4	8.0	505	770	8.0	520	800	8.0	555	840	8.8	580	880
400	406.4	703	600	45 <sup>3)</sup>	191.3	8.0	565	850	8.0	580	875	8.8	620	925	11.1	660	975
500	508.0	797	690	45 <sup>3)</sup>	241.1	7.1	670	950	8.0	715	980	10.0	730	1050	14.2	755	1080
600	610.0	912	705	60	294.8	7.1	780	1075	8.8	840	1105	11.0	845	1165	-	-	-

 $<sup>^{1)}</sup>$  Length tolerance (mm): DN 100 +2/-3, DN 125  $\dots$  200 +3/-4, DN 250  $\dots$  400 +4/-5, DN 500  $\dots$ 600 +5/-6

A\*\*) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information on page 3/267.

SONO 3100, 2-path											
Nominal diam.	Flange type - Weight [kg (lb)]										
DN	PN 10	PN 16	PN 25	PN 40							
100 (4")	-	32 (70.5)	-	35 (77.2)							
125 (5")	-	38 (83.8)	-	44 (97.0)							
150 (6")	-	45 (99.2)	-	52 (114.6)							
200 (8")	59 (130.0)	58 (127.9)	70 (154.3)	79 (174.2)							
250 (10")	73 (161.0)	75 (163.3)	96 (211.6)	117 (257.9)							
300 (12")	83 (183.0)	92 (202.8)	114 (251.3)	151 (332.9)							
350 (14")	98 (216.0)	113 (249.1)	145 (332.9)	191 (421.1)							
400 (16")	119 (262.4)	141 (310.9)	191 (421.1)	275 (606.3)							
500 (20")	153 (337.3)	207 (456.4)	284 (626.0)	379 (836.0)							
600 (24")	193 (425.5)	276 (608.5)	363 (800.3)	-							

Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

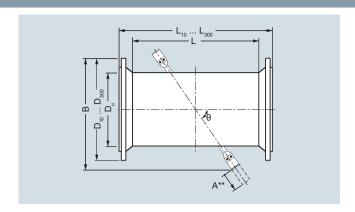
Wall thickness for pressure rates PN 6 ... 40. For weld-in sensor versions according EN10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y=P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du/Wxx > 100).

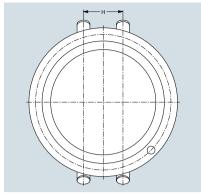
 $<sup>^{3)}</sup>$  For all sensors with flange transducers path angle are  $60^{\circ}$ 

 $<sup>^{</sup>m 4)}$  L is the length of sensor versions without flanges (weld-in version)

<sup>5)</sup> B dimension value is an approximate information and may differ a little by flange pressure rate.

#### Flowmeter SONO 3100/FUS060





Sensor S	Sensor SONO 3100 with ANSI norm										
						Class 150			Class 300	)	
Size (DN)	D <sub>U</sub>	L <sup>1) 4)</sup>	B <sup>5)</sup>	θ	Н	$W_{150}^{2)}$	D <sub>150</sub>	L <sub>150</sub> 1)	$W_{300}^{2)}$	D <sub>300</sub>	L <sub>300</sub> 1)
inch (mm)	[inch]	[inch]	[inch]	[°]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
4 (100)	4.50	33.86	12.01	45 <sup>3)</sup>	1.69	0.14	9.00	39.86	0.25	10.00	40.62
5 (125)	5.50	33.94	12.80	45 <sup>3)</sup>	2.54	0.15	10.00	40.94	0.27	11.00	41.70
6 (150)	6.63	33.94	13.78	45 <sup>3)</sup>	3.07	0.16	11.00	40.94	0.30	12.50	41.70
8 (200)	8.63	26.30	16.93	45 <sup>3)</sup>	4.02	0.16	13.50	34.30	0.29	15.00	35.06
10 (250)	10.75	28.11	18.90	45 <sup>3)</sup>	5.02	0.18	16.00	36.11	0.34	17.50	37.35
12 (300)	12.75	23.90	20.67	45 <sup>3)</sup>	5.98	0.20	19.00	32.90	0.39	20.50	34.14
14 (350)	14.00	25.16	21.65	45 <sup>3)</sup>	6.55	0.21	21.00	35.16	-	-	-
16 (400)	16.00	27.68	23.62	45 <sup>3)</sup>	7.53	0.22	23.50	33.74	-	-	-
20 (500)	20.00	31.38	27.17	45 <sup>3)</sup>	9.49	0.26	27.50	42.76	-	-	-
24 (600)	24.00	35.91	27.76	60	11.61	0.30	32.00	47.91	-	-	-

<sup>1)</sup> Length tolerance (mm): 4" +0.08"/-0.12" (+2/-3mm), 5" ... 8" +0.12"/
-0.16" (+3/-4mm), 10" to 16" +0.16"/-0.20" (+4/-5mm), 20" ... 24" +0.20"/
-0.24" (+5/-6mm)

<sup>2)</sup> Minimum wall thickness for pressure rates Class 150 or Class 300. For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du/Wxx > 100).

 $<sup>^{3)}</sup>$  For all sensors with flange transducers path angle are  $60^{\circ}$ 

 $<sup>^{4)}</sup>$  L is the length of sensor versions without flanges (weld-in version)

<sup>5)</sup> B dimension value is an approximate information and may differ a little by flange pressure rate.

A\*\*) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information in "Sensor SONO 3100 accessories and spare parts" on page 3/267.

SITRANS F US Inline

#### Flowmeter SONO 3100/FUS060

Approximate weights for SONO 3100 sensor with ANSI B16.5 flanges

Nominal diameter		Weight [kg (lb)] <sup>1)</sup>					
DN	DN	CL150		CL300			
[inch]	[mm]	[kg]	[lb]	[kg]	[lb]		
4	100	32	70.5	35	77.2		
5	125	38	83.8	44	97.0		
6	150	45	99.2	52	114.6		
8	200	58	127.9	79	174.2		
10	250	75	165.3	117	257.9		
12	300	92	202.8	151	332.9		
14	350	113	249.1	-	-		
16	400	141	310.9	-	-		
20	500	207	456.4	-	-		
24	600	276	608.5	-	-		

Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

#### Flowmeter SONOKIT (with FUS060 or FUS080)

#### Overview



SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines.

The kit offers all necessary parts and special tools to make the installation as 1-path or 2-path flowmeter.

The set is made for installation on empty pipes or pipes under pressure without process shut-down (hot-tap).

Please contact Siemens for further information on hot-tap tools and instructions.

SONOKIT has inline transducers (in contact with media) which assure superior accuracy and performance.

#### Benefits

- Cost-effective solution contains all the necessary components for retrofitting
- SONOKIT is easy to install in pipeline sizes DN 200 to DN 4000 (8" to 160") 1-path DN 100 to DN 2400 (4" to 96").
- No bypass installation necessary withstands pressures up to 40 bar (580 psi) and media temperatures between -20 °C and +200 °C (-4 °F and +392 °F)
- High accuracy the bigger the pipe, the more accurate the result
- Solid construction and no moving parts for a 100 % maintenance and obstruction-free flowmeter
- The SONOKIT comes with transducers in IP68 enclosure
- Available in a robust version that can be buried and withstands constant flooding
- Inline transducers assure superior accuracy and performance
- Automatic calculation of the calibration factor when pipe geometry data are entered in the transmitter
- FUS060 transmitter versions with HART or PROFIBUS PA
- FUS080 transmitter, battery or mains-powered

#### Application

- Raw water intake for water treatment plants
- Water distribution systems
- Irrigation systems
- Power generation (energy and water)
- District heating plants
- Cooling water plants within the industry and in power stations
- Systems within the oil and refinery business
- Sewage treatment plants
- Plants transporting non-conductive liquids

#### Design

The SONOKIT package box contains all necessary parts to build an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- Papers to wrap around pipes for alignment of sensors
- Transducer alignment tools
- Mounting plates, transducer holders and SONO 3200 transducers
- Transducer cables
- SITRANS FUS060 or FUS080 transmitter for wall mounting
- 4-path version is available on request

#### Technical specifications

## The transmitter related to this system is the SITRANS FUS080 or FUS060.

Technical specifications to the FUS060 see page 3/245 and to FUS080 see page 3/251.

#### Accuracy

Typical, depending on accuracy of measurements of installation

• 2-path: ≤ ± (0.5 ... 1.5 %) • 1-path: ≤ ± (1 ... 3 %)

#### Note

Accuracy depends on the accuracy of the measurements taken at location. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter have a direct effect on the accuracy. Values measured are entered into the memory of the FUSO60 or FUSO80 transmitter.

#### Requirements for pipes

Requirements for pipes	
Size	FUS060: DN 100 DN 4000 (4" 160")
	FUS080: DN 100 DN 1200 (4" 48")
Line pressure	max. 40 bar (580 psi)
Media temperature	
Standard	-10 +200 °C (14 392 °F)
ATEX Ex d version	-20 +200 °C (-4 +392 °F)
ATEX Ex i version	-10 +200 °C (+14 +392 °F)
• Specials	-200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature sensor	
<ul> <li>Standard and Ex-i version</li> </ul>	-20 +60 °C (-4 +140 °F)
• Ex d version	-20 +180 °C (-4 +356 °F)
Transducer enclosure/ approvals/certificates	
Standard version	IP67 (NEMA 6)/IP68 (NEMA 6P)
Ex approval	System ATEX approval for SONO 3200 Ex i transducers together with transmitter FUS060-Ex: ATEX II 2G Ex dem [ia/lb] IIC T6/T4/T3 or
	ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Ex d transducers (for standard FUS060 transmitter, installed outside of Ex zone)
Material certificates	EN 10204-3.1 material certificate on transducer mounting parts
Transducer materials	
Terminal housing	Standard version: PA 6.6, 100 °C (212 °F) or stainless steel AISI 316, 200 °C (392 °F)
Transducer body	Standard version: Stainless steel AISI 316, 200 °C (392 °F)

#### SITRANS F US Inline

#### Flowmeter SONOKIT (with FUS060 or FUS080)

Materials of existing pipeline			
Steel	Transducer holder: EN 10273 or EN 10216 (P235GH)		
	Mounting plates <sup>1)</sup> : EN 10273 or EN 10216 (P235GH)		
Concrete	Transducer holder: Stainless steel AISI 316 or similar		
	Mounting plates 1): (not included)		
Stainless steel	Transducer holder: Stainless stee AISI 316 or similar		
	Mounting plates <sup>1)</sup> : Stainless steel AISI 316 or similar		
Pipe wall thickness			
Steel pipe (AISI 316 and St. 37.2 or corresponding material)	Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79*)		
Concrete pipe	Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9") and pipe sizes ≥ DN 600		

Dimension of the package box (L x W x H, approx.)	856 x 390 x 344 mm (33.7" x 15.4" x 13.5")
Weight example of a package (standard 2-path with FUS060)	approx. 53 kg (116.8 lb)
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on a CD
Material certificate	Material certificate for the transducer parts according to EN 10204-3.1 is optionally available
Approvals	No custody transfer approvals

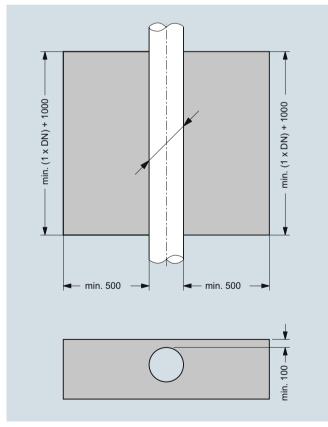
Information on PED approval:

The SONOKIT includes the pipe mounting parts only and therefore it cannot be PED-approved. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

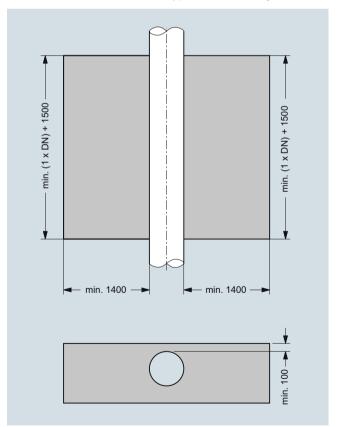
1) Mounting plates are only included for empty pipe installation types (refer to selection "A"). For tapping-band types holder and mounting plates are not included (refer to selection "C").

#### Installation requirements

The space requirements (in mm) around the pipe for retrofitting a SITRANS F US ultrasonic flowmeter type SONOKIT are given below:



Empty pipe installation



Hot-tap installation

#### Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ord	ering data	Article No. Ord. co	ode Selection and Ordering data	Article No. Ord. o	code
SITRANS F US SO		7ME3210-	SITRANS F US SONOKIT	7ME3210-	
I-path sensor			1-path sensor		
	cle No. for the online con- PIA Life Cycle Portal.		IP68 SS housing, Sylgard potting kit, PN 40, O-ring, 200 °C (392 °F), no approval	4	
Diameter	Qn setting [m <sup>3</sup> /h]		IP67 SS housing, PN 40, O-ring, 190 °C	5	
ON 100 (4")	100	1 P	(374 °F), Ex i type, ATEX approval (only with FUS060 Ex)		
N 125 (5")	150	1 T	Cable gland entries		
DN 150 (6")	220	2 B	Cable glands M20 in transducers and in		
ON 200 (8")	380	2 F	transmitter M25/20/16 x 1.5	1	
ON 250 (10")	600	2 K	(FUS080 only M20)		
ON 300 (12")	850	2 P	Cable glands ½" NPT in transducers and in transmitter (only with FUS060)	2	
DN 350 (14") DN 400 (16")	1000 1300	2 T 3 B			
ON 450 (18")	1700	3 F	Transmitter version of SITRANS FUS060 (only DN 100 2400 (4" 96")		
ON 500 (20")	2200	3 K	IP65 (NEMA 4), 120/230 V AC	N	
ON 550 (22")	2600	3 P	IP65 (NEMA 4), 24 V AC/DC	P	
N 600 (24")	3200	3 T	IP65 (NEMA 4), 24 V AC/DC Ex version	Q	
ON 650 (26")	3600	4 B	Transmitter version of SITRANS FUS080		
N 700 (28")	4200	4 F	(only DN 100 1200 (4" 48"))		
N 750 (30")	4800	4 K	PDM software tool and IrDA-adapter, which		
N 800 (32")	5500	4 P	are needed for settings update, to be ordered separately, see FUS080 accessories		
ON 900 (36")	7500 9000	5 B 5 K	IP67/NEMA 4X/6 115 230 V AC	U	
N 1000 (40")			IP67/NEMA 4X/6 3.6 V battery version,	v	
N 1100 (44")	10000	5 P	incl. dual battery pack		
N 1200 (48")	13200	5 T	IP67/NEMA 4X/6 115 230 V AC, incl. 3.6 V	W	
Only for FUS060			single battery backup IP67/NEMA 4X/6 3.6 V battery version	x	
N 1300 (52")	14000	6 A	(no battery pack included) <sup>2)</sup>	î l	
N 1400 (56") N 1500 (60")	16800 19000	6 C 6 E	Transmitter output module		
• • •			Transmitter SITRANS FUS080:		
ON 1600 (64") ON 1700 (68")	22800 25000	6 G 6 J	Pulse and/or alarm output (standard for	A	
N 1800 (72")	27600	6 L	FUS080).		
ON 1900 (76")	31000	6 N	Transmitter SITRANS FUS060:	_	
ON 2000 (80")	36000	6 Q	HART, 1 pulse output, 1 relay HART Ex version, 1 pulse output, 1 relay	B C	
ON 2100 (84")	37000	6 S			
ON 2200 (88")	42000	6 U	PROFIBUS PA, 1 pulse/frequency	D	
DN 2300 (92")	45000	6 W	Transducer coaxial cables (with FUS080 only, 15 and 30 m, 70°C		
ON 2400 (96")	51000	7 A	(158 °F) cable types)		
nstallation metho			2 x 3 m, max. 70 °C (158 °F), the only option	0	
	ansducer holder and Alignment rods and tools	A	for Ex i		
nust be ordered as			2 x 15 m, max. 70 °C (158 °F) 2 x 30 m, high temp. max. 200 °C (392 °F)	1	
	under pressure (mounting	В		2	
olates <b>not</b> incl.). Sp oe ordered separat	pecial mounting tools to		2 x 30 m, max. 70 °C (158 °F) 2 x 60 m, max. 70 °C (158 °F)	3 4	
SONOKIT for tapping	•	С	2 x 90 m, max. 70 °C (158 °F)	5	
DN 200 DN 180	0) (trandsducer holder		2 x 120 m, max. 70 °C (158 °F)	6	
ind mounting plate o be ordered sepa	es <b>not</b> incl., tapping band rately) <sup>1)</sup>		2 x 120 m, max. 70 C (136 F) 2 x 3 m, high temp. max. 200 °C (392 °F),	7	
	**		the only option for Ex i		
ransducer holder lone (for tapping b		0	2 x 15 m, high temp. max. 200 °C (392 °F)	8	
	h = 160 mm, mounting	1	Special version (add Order code):		
lates in carbon ste	eel		No transducer cable, cable length 2 x 3 m,	9 F	R 0
	gth = 160 mm, mounting	2	the only option for Ex i	9 F	R 0 I
lates in stainless s	gth = 230 mm, for con-	3	No transducer cable, cable length 2 x 15 m		
rete pipe (DN 600			No transducer cable, cable length 2 x 30 m No transducer cable, cable length 2 x 60 m		R 0 ( R 0 I
ransducer type a	nd approval		· · · · · ·	•	
P67 (NEMA 4X/6) F	PA housing, PN 40,	1	No transducer cable, cable length 2 x 90 m No transducer cable, cable length 2 x 120 m		R 0   R 0
D-ring, 100 °C (212	,			3	
	N 40, O-ring, 180 °C	2	1) Tapping band via special request	4-41-1 - 1 - 1 - 1	
356 °F), Ex d, ATE standard FUS060)	X approval (only with		2) Lithium batteries are subject to special transporing to United Nations "Regulation of Dangerous		
•	ylgard potting kit, PN 40,	3	3091". Special transport documentation is requi	red to observe these r	
os PA nousing, S )-ring, 100 °C (212	yigaru pollirig kil, FIN 40, 2°F), no approval		lations. This may influence both transport time a		
5, (	74 I I I I I I		3) Mounting tools must be ordered separately as "	-Z-options.	

<sup>3)</sup> Mounting tools must be ordered separately as "-Z"-options.

#### Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material EN 10204-3.1, transducer holder material EN 10204-3.1, mounting plate material	F30 F31 F32
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	Y17
Accessories	
Alignment rods-set for DN 100 650 (4" 26") $\varnothing$ = 25 mm, L = 500 mm, 3 pcs.	S10
Alignment rods-set for DN 700 1900 (28" 76") $\varnothing$ = 25 mm, L = 500 mm, 6 pcs.	S11
Alignment rods-set for DN 2000 2400 (80" 96") $\varnothing$ = 25 mm, L = 500 mm, 8 pcs.	S12
Spanner key for tranducer mounting type SONO 3200 O-ring type	T11
Tool set with various mounting/spare parts for SONOKIT installation	T12

#### Operating instructions

Description	Article No.	
SITRANS FUS060		
• English	A5E01204521	
German	A5E02123845	
SITRANS FUS080		
• English	A5E03059912	
German	A5E31628428	
<ul> <li>Spanish</li> </ul>	A5E31628493	
• French	A5E31628438	
SITRANS F US SONOKIT 1-path		
• English	A5E00814557	
German	A5E02610428	
<ul> <li>Spanish</li> </ul>	A5E02608231	
• French	A5E02610419	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation



Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

## Flowmeter SONOKIT (with FUS060 or FUS080)

0 1 11 10		A 17 1 N1 O 1 1		
Selection and Ordering data SITRANS F US SONOKIT		Article No. Ord. code	Selection and Ordering data	Article No. Ord. code
2-path sensor	JNUKII	7 M E 3 2 2 0 -	SITRANS F US SONOKIT 2-path sensor	7 M E 3 2 2 0 -
·			<u> </u>	
	icle No. for the online con- PIA Life Cycle Portal.		Transducer holder	
Diameter	Qn setting [m <sup>3</sup> /h]		None (for tapping band)  Carbon steel, length = 160 mm, mounting	0
DN 200 (8")	380	2 F	plates in carbon steel	,
DN 250 (10")	600	2 K	Stainless steel, length = 160 mm, mounting	2
DN 300 (12")	850	2 P	plates in stainless steel Stainless steel, length = 230 mm, for con-	3
DN 350 (14")	1000	2 T	crete pipe (DN 600 DN 4000)	
DN 400 (16") DN 450 (18")	1300 1700	3 B 3 F	Transducer type and approval	
DN 500 (20")	2200	3 K	IP67 (NEMA 4X/6) PA housing, PN 40,	1
DN 550 (20")	2600	3 P	O-ring, 100 °C (212 °F), no approval	2
DN 600 (24")	3200	3 T	IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), EEx d, ATEX approval	
DN 650 (26")	3600	4 B	(only with standard FUS060)	
DN 700 (28")	4200	4 F	IP68 PA housing, Sylgard potting kit, PN 40, SS, O-ring, 100 °C (212 °F), no approval	3
DN 750 (30")	4800	4 K	IP68 SS housing, Sylgard potting kit, PN 40,	4
DN 800 (32") DN 900 (36")	5500 7500	4 P 5 B	SS, O-ring, 200 °C (392 °F), no approval	
DN 1000 (40")	9000	5 K	IP67 SS housing, PN 40, O-ring, 190 °C	5
DN 1100 (44")	10 000	5 P	(374 °F), Ex i, ATEX approval (only with FUS060 Ex)	
DN 1200 (48")	13 200	5 T	Cable gland entires	
Only for FUS060			Cable glands M20 in transducers and in	
DN 1300 (52")	14 000	6 A	transmitter M25/20/16 x 1.5	
DN 1400 (56") DN 1500 (60")	16 800 19 000	6 C 6 E	(FUS080 only M20)	
DN 1600 (64")	22 800	6 G	Cable glands ½" NPT in transducers and in transmitter (only with FUS060)	2
DN 1700 (68")	25 000	6 J	Transmitter version of SITRANS FUS060	
DN 1800 (72")	27 600	6 L	(only DN 200 4000 (8" 160"))	
DN 1900 (76")	31 000	6 N	IP65 (NEMA 4), 120/230 V AC	N
DN 2000 (80")	36 000 37 000	6 Q 6 S	IP65 (NEMA 4), 24 V AC/DC IP65 (NEMA 4), 24 V AC/DC Ex version	P
DN 2100 (84") DN 2200 (88")	42 000	6 U	Transmitter version of SITRANS FUS080	-
DN 2300 (92")	45 000	6 W	(only DN 200 1200 (8" 48"))	
DN 2400 (96")	51 000	7 A	PDM software tool and IrDA-adapter, which	
DN 2500 (100")	53 000	7 C	are needed for settings update, to be ordered separately, see FUS080 accessories	
DN 2600 (104")	60 000	7 E	IP67/NEMA 4X/6 115 230 V AC	U
DN 2700 (108") DN 2800 (112")	62 000 72 000	7 G 7 J	IP67/NEMA 4X/6 3.6 V battery version, incl.	v
DN 2900 (116")	71 000	7 L	dual battery pack IP67/NEMA 4X/6 115 230 V AC, incl. 3.6 V	w
DN 3000 (120")	78 000	7 N	single battery backup	"
DN 3100 (124")	82 000	7 Q	IP67/NEMA 4X/6 3.6 V battery version (no battery pack included) <sup>4)</sup>	Х
DN 3200 (128")	85 000	7 S	Transmitter output module	
DN 3300 (132") DN 3400 (136")	92 000 100 000	7 U 7 W	Transmitter output module Transmitter SITRANS FUS080:	
DN 3500 (140")	100 000	8 A	Pulse and/or alarm output (standard for	A
DN 3600 (144")	110 000	8 C	FUS080).	
DN 3700 (148")	120 000	8 E	Transmitter SITRANS FUS060:	
DN 3800 (152")	130 000	8 G	HART, 1 pulse output, 1 relay HART Ex version, 1 pulse output, 1 relay	B C
DN 3900 (156") DN 4000 (160")	130 000 144 000	8 J 8 L	PROFIBUS PA, 1 pulse/frequency	D
Installation method		- 01	The ibeeth, i paleomequency	
Empty pipe (incl. t	ransducer holder and Alignment rods and tools	A		
Hot tap, mounting plates <b>not</b> incl.). S	Hot tap, mounting under pressure (mounting plates <b>not</b> incl.). Special mounting tools to			
be ordered separa SONOKIT for tapp		С		
(DN 200 DN 180	00) (trandsducer holder es <b>not</b> incl., tapping band			
1) Tapping band via				

<sup>1)</sup> Tapping band via special request

<sup>2)</sup> Mounting tools must be orderd separately as "-Z" options

#### SITRANS F US Inline

#### Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Article No. Or	d.	code
SITRANS F US SONOKIT	7ME3220 -		
2-path sensor		1	
Transducer coaxial cables (with FUS080 only, 15 and 30 m, 70°C (158°F) cable types)  4 x 3 m, max. 70 °C (158°F), the only option for Ex i  4 x 15 m, max. 70 °C (158°F)  4 x 30 m, high temp. max. 200 °C (392°F)		0 1 2	
4 x 30 m, max. 70 °C (158 °F) 4 x 60 m, max. 70 °C (158 °F) (up to DN 3000) 4 x 90 m, max. 70 °C (158 °F) (up to DN 3000) 4 x 120 m, max. 70 °C (158 °F) (up to DN 3000) 4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i		3 4 5 6 7	
4 x 15 m, high temp. max. 200 °C (392 °F)  Special version (add Order code):  No transducer cable, cable length 4 x 3 m, the only option for Ex i  No transducer cable, cable length 4 x 15 m		9 9	R 0 A R 0 B
No transducer cable, cable length $4\times30~\text{m}$ No transducer cable, cable length $4\times60~\text{m}$ (up to DN 3000)		9	ROC ROD
No transducer cable, cable length 4 x 90 m (up to DN 3000) No transducer cable, cable length 4 x 120 m (up to DN 3000)		9	R O E R O F

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material EN 10204-3.1, transducer holder material EN 10204-3.1, mounting plate material	F30 F31 F32
Tag name plate Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	Y17
Accessories	
Alignment rods-set for DN 100 750 (4" 30") Ø = 25 mm, L = 500 mm, 3 pcs.	S10
Alignment rods-set for DN 800 2100 (32" 84") Ø = 25 mm, L = 500 mm, 6 pcs.	S11
Alignment rods-set for DN 2200 4000 (88" 160") Ø = 25 mm, L = 500 mm, 8 or 10 pcs.	S12
Spanner key for tranducer mounting type SONO 3200 O-ring type	T11
Tool set with various mounting/spare parts for SONOKIT installation	T12

#### Operating instructions

Operating instructions					
Description	Article No.	_			
SITRANS FUS060					
• English	A5E01204521				
German	A5E02123845				
SITRANS FUS080					
• English	A5E03059912				
German	A5E31628428				
<ul><li>Spanish</li></ul>	A5E31628493				
• French	A5E31628438				
SITRANS F US SONOKIT 2-path					
• English	A5E02445496				
German	A5E02554972				
<ul><li>Spanish</li></ul>	A5E02555037				
• French	A5E02555044				
• Czech	A5E02814192				

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation



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## Flowmeter SONOKIT (with FUS060 or FUS080)

## Flowmeter SONOKIT accessories and spare parts

#### Accessories

Potting kit for SONO 3200 terminal housing

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403	

#### Tools for SONO 3200 transducers and SONOKIT

Description	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F))		60
For transducer length:		11/10
• Up to 160 mm (6.3")	FDK:085B5333	1/2/
• Up to 230 mm (9.1")	FDK:085B5335	O 3
Angle measurement tool for SONOKIT	FDK:085B5330	-
Hot-tap drilling tool for SONOKIT, the extraction tool is required, max. pressure 40 bar (580 psi)	FDK:085B5392	
Alignment tool for SONOKIT (typically for hot-tapping) For use on pipe sizes in the range DN 300 to DN 1200.	FDK:085B5393	Ta SEC

Description	Article No.	
Alignment rods-set for DN 100 650 (4" 26"), Ø = 25 mm, L = 500 mm, 3 pcs.	A5E02609214	
Alignment rods-set for DN 700 1900 (28" 76"), Ø = 25 mm, L = 500 mm, 6 pcs.	A5E02609215	
Alignment rods-set for DN 2000 4000 (80" 160"), Ø = 25 mm, L = 500 mm, 10 pcs.	A5E02609216	/
Spanner key for tranducer mounting type SONO 3200 O-ring type	A5E02609218	
Tool set with various mounting/spare parts for SONOKIT installation	A5E02609219	

#### SITRANS F US Inline

#### Flowmeter SONOKIT (with FUS060 or FUS080)

Cable connection boxes (For the connection of individual transducer cables with the FUS060 transducer cables)

. cocco il allocador. cabico,		
Description	Article No.	
Junction box for coaxial cable		
• IP68 metal box for 2 coaxial cables	FDK:085B1360	
IP68 metal box for 4 coaxial cables	FDK:085B1361	000
<ul> <li>IP68 EEx e plastic box for 2 coaxial cables, no ATEX approval</li> </ul>	FDK:085B1362	
<ul> <li>IP68 EEx e plastic box for 4 coaxial cables, no ATEX approval</li> </ul>	FDK:085B1363	

#### Spare parts

Transducer SONO 3200 spare parts, complete transducer with ½"-NPT cable glands

Trans- ducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 +100 (-4 +212)	160 (6.3)	A5E00839476	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 +200 <sup>1)</sup> (-4 +392)	160 (6.3)	A5E00839435	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 +100 (-4 +212)	230 (9.41)	A5E00839477	£
O-ring	316 SS	O-ring	PN 40	316 SS		-20 +200 <sup>1)</sup> (-4 +392)	230 (9.41)	A5E00839437	

<sup>1) 316</sup> SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.

#### Transducer SONO 3200 spare parts, complete transducer with M20 cable glands

Trans- ducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 +100 (-4 +212)	160 (6.3)	FDK:085B5454	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 +200 <sup>1)</sup> (-4 +392)	160 (6.3)	FDK:085B5455	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 +100 (-4 +212)	230 (9.41)	FDK:085B5458	A
O-ring	316 SS	O-ring	PN 40	316 SS	Ex d <sup>2)</sup>	-20 +200 (-4 +392)	160 (6.3)	FDK:085B5452	
O-ring	316 SS	O-ring	PN 40	316 SS	Ex i <sup>3)</sup>	-10 +200 (14 392)	160 (6.3)	A5E00836462	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 +200 <sup>2)</sup> (-4 +392)	230 (9.41)	FDK:085B5459	

<sup>1) 316</sup> SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.

#### Transducer SONO 3200 spare parts, transducer terminal housing with M20 cable glands

Туре	Article No.	
Material: PA 6.6, Temperature range: -20 +100 °C (-4 +212 °F)	FDK:085B5501	
Material: AISI 316, Temperature range: -20 +200 °C (-4 +392 °F)	FDK:085B5504	
Material: AISI 316, Ex d <sup>1)</sup> , Temperature range: -20 +200 °C (-4 +392 °F)	FDK:085B5505	
Material: AISI 316, Ex i <sup>2)</sup> , Temperature range: -10 +200 °C (14 392 °F)	A5E00835255	
material. Allere to, Ext., Temperature range. To 1200 O (14 002 T)	7.02000200	

<sup>1)</sup> ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

<sup>&</sup>lt;sup>2)</sup> ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

 $<sup>^{3)}</sup>$  For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

<sup>&</sup>lt;sup>2)</sup> For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

#### Flowmeter SONOKIT (with FUS060 or FUS080)

#### Transducer SONO 3200 spare parts, transducer terminal housing with 1/2"-NPT cable glands

Туре	Article No.	
Material: PA 6.6, Temperature range: -20 +100 °C (-4 +212 °F)	A5E00839460	
Material: AISI 316, Temperature range: -20 +200 °C (-4 +392 °F)	A5E00839427	99

#### Transducer SONO 3200 spare parts transducer body with insert as well as insert only

Temperature range [°C (°F)]	Gasket	Length [mm (inch)]	Article No.	
-20 +200 (-4 +392)	O-ring (FFKM O-ring material) <sup>1)</sup>	160 (6.3)	FDK:085B1406	-
-20 +200 (-4 +392)	O-ring (FKM 602 O-ring material) <sup>2)</sup>	160 (6.3)	FDK:085B5510	
-20 +200 (-4 +392)	O-ring	230 (9.41)	FDK:085B5511	

Chemical resistant O-ring material. Body specially for Ex-approved transducers.
 Body specially for standard transducers.

Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
-20 +200 (-4 +392)	160 (6.3)	FDK:085B1419	.e.
-20 +200 (-4 +392)	230 (9.41)	FDK:085B1420	Carron and a second

#### Transducer SONO 3200 gasket

Туре	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for O-ring transducers)	PN 40	FKM	-20 +200 (-4 +392)	FDK:085B1089	88

#### Cables for SONOKIT SONO 3200 transducers with FUS060

Description	Length [m (ft)]	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC)	3 (9.84)	A5E00875101	
(2 pcs.)	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.70)	A5E01278698	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp.	3 (9.84)	A5E00875105	
transducer part, max. 200 °C (392 °F) and black PVC transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 $\Omega$ )	15 (49.21)	A5E00861435	
(2 pcs.)	30 (98.43)	A5E01196952	

#### Cables for SONOKIT SONO 3200 transducers with FUS080

Description	Length [m (ft)]	Article No.	
Coaxial cable for FUS080, (75 Ω, max. 70 °C (158 °F), black PVC)	15 (49.21)	A5E02478541	
(2 pcs.)	30 (98.43)	A5E02478751	

#### SITRANS F US Inline

#### Flowmeter SONOKIT (with FUS060 or FUS080)

#### Transducer holder for SONOKIT SONO 3200 transducers

Description	Article No.	
1-path (each incl. 1 pc.)		
• 160 mm (6.3") stainless steel 45°, DN 100 DN 150 (4" 6")	FDK:085L1103	
• 160 mm (6.3") carbon steel 45°, DN 100 DN 150 (4" 6")	FDK:085L1102	
• 230 mm (9.1") for concrete pipe 60°, DN 600 DN 2400 (24" 96")	FDK:085L1107	
• 160 mm (6.3") stainless steel 60°, DN 200 DN 2400 (8" 96")	FDK:085L1105	
• 160 mm (6.3") carbon steel 60°, DN 200 DN 2400 (8" 96")	FDK:085L1104	
2-path (each incl. 1 pc.)		
• 230 mm (9.1") for concrete pipe 60°, DN 600 DN 4000 (24" 160")	FDK:085L1111	
• 160 mm (6.3") stainless steel 60°, DN 200 DN 4000 (8" 160")	FDK:085L1109	
• 160 mm (6.3") carbon steel 60°, DN 200 DN 4000 (8" 160")	FDK:085L1108	

The other transducer holder parts are either completely in stainless steel for the concrete and stainless steel pipes (AISI 316L/1.4404 or similar). For carbon pipes the part welded onto the pipe is in carbon steel (St.37 or similar). Thread part is stainless steel (AISI 316L/1.4404 or similar).

#### Mounting plate for SONOKIT SONO 3200 transducers

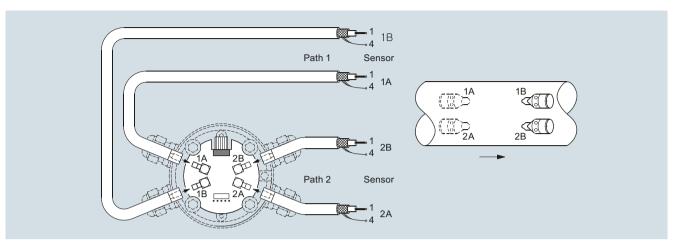
Description	Article No.	
1-path (each incl. 1 pc.)		
• Stainless steel plate, 45°, DN 100 DN 150 (4" 6")	FDK:085L1113	
• Carbon steel plate, 45°, DN 100 DN 150 (4" 6")	FDK:085L1112	
• Stainless steel plate, 60°, DN 200 DN 2400 (8" 96")	FDK:085L1115	
• Carbon steel plate, 60°, DN 200 DN 2400 (8" 96")	FDK:085L1114	
2-path (each incl. 1 pc.)		
• Stainless steel plate, 60°, DN 200 DN 4000 (8" 160")	FDK:085L1119	
• Carbon steel plate, 60°, DN 200 DN 4000 (8" 160")	FDK:085L1118	

The mounting plates are either in stainless steel (AISI 316L/1.4404 or similar) or carbon steel (St.37 or similar).

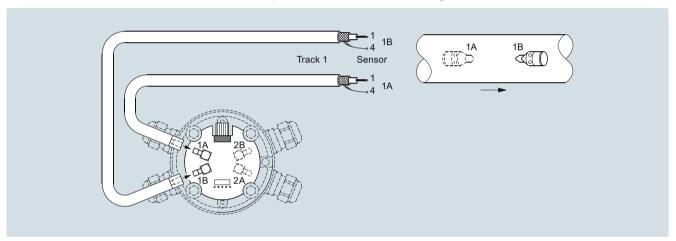
#### SONO 3200 cable glands

Type/ description	Tempera- ture range [°C (°F)]	Appr	Article No.	
black PA plastic, cable Ø 5 13 mm	-20 100 (-4 +212)		A5E02246304	
½" NPT gray PA plastic, cable Ø 5 9 mm			A5E02246309	
½" NPT crome- plated brass, cable Ø 5 9 mm	-40 100 (-40 +212)		A5E02246258	
M20 stain- less steel, cable Ø 4 6 mm	-25 200 (-13 +392)	Exi	A5E02246194	
M20 stain- less s teel, cable Ø 5 8 mm	-60 180 (-76 +356)	Ex d	A5E02246311	

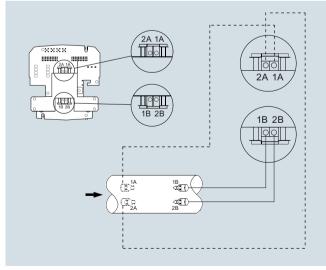
## Schematics



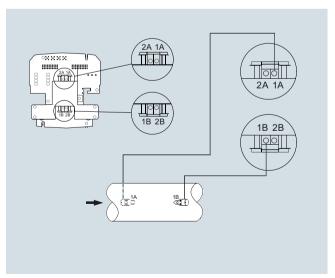
Electrical connection of SITRANS FUS060 and SONOKIT 2-path. Max. 30 m transducer cable length for sizes ≥ DN 3000.



Electrical connection of SITRANS FUS060 and SONOKIT 1-path



Electrical connection of SITRANS FUS080 and SONOKIT 2-path



Electrical connection of SITRANS FUS080 and SONOKIT 1-path

SITRANS F US Inline

#### Flowmeter SITRANS FUS380 standard

#### Overview



The 2-path flowmeter SITRANS FUS380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants and other general water applications.

The type-approved flowmeter version is named SITRANS FUE380 - see page 3/289.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

#### Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- · Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q<sub>i</sub> (min): Q<sub>s</sub> (max) up to 1:400

#### Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in energy meter systems in district heating networks or chilled water.

#### Design

The 2-path design of SITRANS FUS380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUS080.

The unit is available in a compact or a remote version with up to 30 meter distance from flowmeter to transmitter. When ordering a compact version the transducer cables are pre-mounted and ready for installation.

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

#### Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading. SITRANS FUS380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

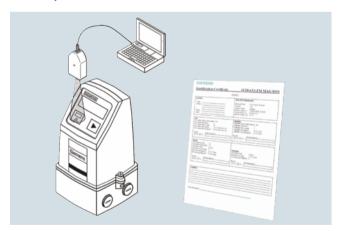
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

#### Function

Together with the SIMATIC PDM tool the FUS380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- General settings, flowmeter and battery information, totalizer values, and pulse output settings
- Detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



#### Configuration SITRANS FUS380

#### Selection guide SITRANS FUS380, standard version

DN	Q <sub>s</sub> (m <sup>3</sup> /h)	Q <sub>max</sub> (m <sup>3</sup> /h) (105 % of Q <sub>s</sub> )	Q <sub>p</sub> (m <sup>3</sup> /h)	Q <sub>i</sub> (m <sup>3</sup> /h) (1:100 of Q <sub>p</sub> )	Cut-off (m <sup>3</sup> /h)	Cut-off (% of Q <sub>max</sub> )	Typical pulse value <sup>1)</sup> (I/pulse
50	15	15.75	15	0.15	0.075	0.48	1
50	45	47.25	15	0.15	0.075	0.16	1
50	45	47.25	30	0.3	0.150	0.32	1
35	25	26.25	25	0.25	0.125	0.48	1
65	72	75.6	25	0.25	0.125	0.17	1
65	72	75.6	50	0.5	0.250	0.33	1
30	40	42	40	0.4	0.200	0.48	2.5
30	120	126	40	0.4	0.200	0.16	2.5
30	120	126	80	0.8	0.400	0.32	2.5
100	60	63	60	0.6	0.300	0.48	2.5
100	180	189	60	0.6	0.300	0.16	2.5
100	240	252	120	1.2	0.600	0.24	2.5
125	10	10.5	100	1	0.500	4.76	2.5
125	280	294	100	1	0.500	0.17	2.5
125	400	420	200	2	1.000	0.24	2.5
150	150	157.5	150	1.5	0.750	0.48	10
150	420	441	150		0.750	0.48	10
150				1.5			
	560	588	300	3	1.500	0.26	10
200	250	262.5	250	2.5	1.250	0.48	10
200	700	735	250	2.5	1.250	0.17	10
200	900	945	500	5	2.500	0.26	10
250	400	420	400	4	2.000	0.48	10
250	1 120	1 176	400	4	2.000	0.17	10
250	1 400	1 470	800	8	4.000	0.27	10
300	560	588	560	5.6	2.800	0.48	50
300	1 560	1 638	560	5.6	2.800	0.17	50
300	2 100	2 205	1 120	11.2	5.600	0.25	50
350	750	787.5	750	7.5	3.750	0.48	50
350	2 100	2 205	750	7.5	3.750	0.17	50
350	2 800	2940	1 500	15	7.500	0.26	50
400	950	9 97.5	950	9.5	4.750	0.48	50
400	2 660	2 793	950	9.5	4.750	0.17	50
400	3 600	3 780	1 900	19	9.500	0.25	50
500	1 475	1 548.75	1 475	14.75	7.375	0.48	100
500	4 130	4 336.5	1 475	14.75	7.375	0.17	100
500	5 500	5 775	2 950	29.5	14.750	0.26	100
600	2 150	2 257.5	2 150	21.5	10.750	0.48	100
600	6 020	6 321	2 150	21.5	10.750	0.17	100
600	8 000	8 400	4 300	43	21.500	0.17	100
700	2 900	3 045	2 900	29	14.500	0.48	100
700	8 120	8 526	2 900	29	14.500	0.17	100
700	10 800	11 340	5 800	58	29.000	0.26	100
300	3 800	3 990	3 800	38	19.000	0.48	100
300	10 640	11 172	3 800	38	19.000	0.17	100
300	14 200	14 910	7 600	76	38.000	0.25	100
900	5 000	5 250	3 800	38	19.000	0.36	100
900	14 000	14 700	5 000	50	25.000	0.17	100
900	20 000	21 000	5 000	50	25.000	0.12	100
1 000	6 000	6 300	3 800	38	19.000	0.30	100
1 000	16 800	17 640	6 000	60	30.000	0.17	100
1 000	24 000	25 200	12 000	120	60.000	0.24	100
1 200	9 000	9 450	3 800	38	19.000	0.20	100
1 200	25 200	26 460	9 000	90	45.000	0.17	100
1 200	36 000	37 800	18 000	180	90.000	0.24	100

The values  $Q_i$ ,  $Q_p$  and  $Q_s$  are shown on the system label of the FUS380.  $Q_i$  ( $Q_{min}$ ) means the minimal and  $Q_p$  ( $Q_{nom}$ ) the nominal flow rate.  $Q_s$  is the highest operatable flow rate. The maxium flow rate ( $Q_{max}$ ) is 105 % of  $Q_s$ . The low flow cut-off is 50 % of  $Q_i$ .

In order to obtain best pulse output resolution in the range  $Q_{min}$  to  $Q_s$  of approx. 100 Hz at  $Q_s$ , two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows  $Q_p(Q_n)$ . This flow rate is between  $Q_i(Q_{min})$  and  $Q_s$  and indicates the normal or typical flow.

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse >  $Q_s$  (m³/h) /360. For example  $Q_s$  = 300 m³/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

<sup>1)</sup> Typical pulse values for SITRANS FUS380 with pulse length 5 ms. Other values are possible - please see the selections at the 7ME340 Order codes.

SITRANS F US Inline

#### Flowmeter SITRANS FUS380 standard

#### Technical specifications

reclinical specifications	
Sensor design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size (DN 50 DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40
	EN 1092-1 flanges:  • type 01 (B): DN 100 to DN 125  • type 11 (B): DN 150 to DN 1200  • type 11 (B) 'design': DN 50 to DN 80
Pipe material	<ul> <li>DN 100 DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray.</li> <li>DN 50 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)</li> </ul>
Transducer design	DN 100 DN 1200: Inline version and welded onto the pipe     DN 50 DN 80:     Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/ brass (CuZn <sub>36</sub> Pb <sub>2</sub> As)
Sensor operating conditions	
Ambient temperature	
Operation	-10 +60 °C (14 140 °F) (MID version: -10 +55 °C (14 131 °F))
• Storage	-40 +85 °C (-40 +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature • DN 100 DN 1200	Remote: 2 200 °C
• DN 50 DN 80	(35.6 392 °F) Remote: 2 150 °C (35.6 302 °F)
• DN 50 DN 1200	Compact: 2 120 °C (35.6 248 °F)
Degree of protection	Sensor connection IP67/NEMA 4X/6
Max. flow velocity	DN 50 DN 1200: 9 m/s (29.5 ft/s)
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CSPRI-11
Noise immunity	To EN/IEC 61236-1 (Industry)

#### Transmitter

The transmitter related to this system is the SITRANS FUS080. Technical specifications to the FUS080 see page 3/251 ff.

reclinical specifications to the r	03000 see page 3/231 II.
Sensor cable	
Cable length	Max. 30 m (98.4 ft) between transmitter and sensor
Certificates and approvals	
Conformity certificate	The devices are supplied as stan- dard with a Siemens Certificate of Conformity on CD
Material certificate	Material certificate according EN 3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	No custody transfer approvals

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

#### SITRANS FUS380 uncertainty

	FUS380
Flow value setting	Predefined settings according to dimension
Approval	No approval
Flow rate v <sub>f</sub>	0.02 9 m/s (0.065 29.5 ft/s)
Output A	Pulse: forward, reverse, forward net, reverse net (Preset: forward)
Output B	Pulse (forward, reverse, forward net, reverse net, alarm, call-up (Preset: alarm)
Pulse value A & B (depending on DN value)	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m³/p, 2.5 m³/p, 5 m³/p, 10 m³/p, 25 m³/p, 50 m³/p, 100 m³/p, 250 m³/p, 500 m³/p, 1000 m³/p
Pulse width	5/10/20/50/100/200/500 ms
Flow unit setup	Preset: m <sup>3</sup> /h
Volume unit setup	Preset: m <sup>3</sup>

#### Flowmeter Calibration and traceability

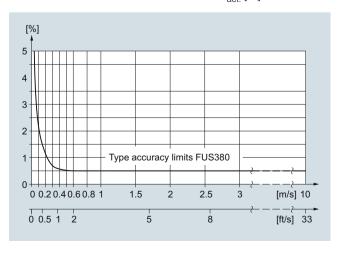
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with  $Q_n$  as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at  $Q_i$ , 10 %  $Q_p$  and  $Q_p$  (max. 4 200 m³/h).

#### Accuracy SITRANS FUS380:

 $\pm$  0.5 % for 0.5 m/s < v < 10 m/s and  $\pm$  0.25/ $V_{act}$  [%] below 0.5 m/s



#### Flowmeter SITRANS FUS380 standard

	Selection and Ordering data			No. Orde	r code
Flowmeter SITRANS	Flowmeter SITRANS FUS380 (standard)		7 M E 3		
✓ Click on the Article figuration in the Pl				0 - <b>- A</b>	
Diameter		ting [m <sup>3</sup> /h]			
DN 50 (2") <sup>2)</sup> DN 50 (2") <sup>2)</sup> DN 50 (2") <sup>2)</sup>	15 15 30	15 45 45	1 A 1 C 1 D		
DN 65 (2½") <sup>2)</sup> DN 65 (2½") <sup>2)</sup> DN 65 (2½") <sup>2)</sup>	25 25 50	25 72 72	1 E 1 G 1 H		
DN 80 (3") <sup>2)</sup> DN 80 (3") <sup>2)</sup> DN 80 (3") <sup>2)</sup>	40 40 80	40 120 120	1 J 1 L 1 M		
DN 100 (4") DN 100 (4") DN 100 (4")	60 60 120	60 180 240	1 N 1 Q 1 R		
DN 125 (5") DN 125 (5") DN 125 (5")	100 100 200	100 280 400	1 S 1 U 1 V		
DN 150 (6") DN 150 (6") DN 150 (6")	150 150 300	150 420 560	2 A 2 C 2 D		
DN 200 (8") DN 200 (8") DN 200 (8")	250 250 500	250 700 900	2 E 2 G 2 H		
DN 250 (10") DN 250 (10") DN 250 (10")	400 400 800	400 1 120 1 400	2 J 2 L 2 M		
DN 300 (12") DN 300 (12") DN 300 (12")	560 560 1 120	560 1 560 2 100	2 N 2 Q 2 R		
DN 350 (14") DN 350 (14") DN 350 (14")	750 750 1 500	750 2 100 2 800	2 S 2 U 2 V		
DN 400 (16") DN 400 (16") DN 400 (16")	950 950 1 900	950 2 660 3 600	3 A 3 C 3 D		
DN 500 (20") DN 500 (20") DN 500 (20")	1 475 1 475 2 950	1 475 4 130 5 500	3 J 3 L 3 M		
DN 600 (24") DN 600 (24") DN 600 (24")	2 150 2 150 4 300	2 150 6 020 8 000	3 S 3 U 3 V		
DN 700 (28") DN 700 (28") DN 700 (28")	2 900 2 900 5 800	2 900 8 120 10 800	4 E 4 G 4 H		
DN 800 (32") DN 800 (32") DN 800 (32")	3 800 3 800 7 600	3 800 10 640 14 200	4 N 4 Q 4 R		
DN 900 (36") DN 900 (36") DN 900 (36")	5 000 5 000 10 000	5 000 14 000 20 000	5 A 5 C 5 D		
DN 1 000 (40") DN 1 000 (40") DN 1 000 (40")	6 000 6 000 12 000	6 000 16 800 24 000	5 J 5 L 5 M		
DN 1 200 (48") DN 1 200 (48") DN 1 200 (48")	9 000 9 000 18 000	9 000 25 200 36 000	5 S 5 U 5 V		

5 V This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

Selection and Ordering data	Artic	ما	NI	_		)ro	101	code
Flowmeter SITRANS FUS380 (standard)	7 M E					71 C	101	code
Trownicter of Than or 50000 (Standard)						Α		
Flange norm and pressure rating					Н		1	
System without sensor - only a transmitter FUS080 as spare part - settings as defined with this Article No. EN 1092-1 Flanges • PN 16 (DN 100 DN 1 200) • PN 25 (DN 200 DN 1 000) • PN 40 (DN 50 DN 250) <sup>3)</sup>	C	;						
Compact/remote connection								
Compact version, max. 120 °C (248 °F) Remote version, max. 150/200 °C (302/392 °F) • 5 m (16.4 ft) • 10 m (32.8 ft) • 20 m (65.6 ft) • 30 m (98.4 ft)		0 2 3 4 5						
Pulse output value setup <sup>5)</sup>				ı,				
0.1 l/p 1 l/p 2.5 l/p				2 3	2			
10 l/p 50 l/p 100 l/p				5	,			
250./pulse 1 m³/pulse				7				
0.25 l/pulse 0.5 l/pulse 5 l/pulse 25 l/pulse				9 9	)			NOA NOB NOC NOD
500 l/pulse 2.5 m³/pulse 5 m³/pulse				9	)			NOE NOF NOG
10 m <sup>3</sup> /pulse 25 m <sup>3</sup> /pulse 50 m <sup>3</sup> /pulse				9	)			NOH NOJ NOK
100 m <sup>3</sup> /pulse 250 m <sup>3</sup> /pulse 500 m <sup>3</sup> /pulse				9	)			N 0 L N 0 M N 0 N
1000 m <sup>3</sup> /pulse				9	)			N O P
Transmitter version of SITRANS FUS080  IP67/NEMA 4X/6 115 230 V AC IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack <sup>4)</sup> IP67/NEMA 4X/6 115 230 V AC, including 3.6 V single battery backup <sup>4)</sup> IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)					B D E G			
Pulse width setup 5 ms (standard) 10 ms 20 ms							2 3 4	
50 ms 100 ms 200 ms 500 ms							5 6 7 8	

L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

Q<sub>p</sub> (Q<sub>n</sub>) is the normal or typical flow. Q<sub>p</sub> and Q<sub>s</sub> is shown on the system label. Pipe material bronze brass.
 PN 40 standard for DN 50 ... DN 80 die-cast bronze pipes.
 Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
 To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse > Q<sub>s</sub> (m³/h) /360.
 For example Q<sub>s</sub> = 300 m³/h; L/pulse > 300/360;
 L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

#### SITRANS F US Inline

#### Flowmeter SITRANS FUS380 standard

Coloction and Ordering data	Order code
Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and following addon code(s) with plain text.	
Calibration/certificate FUS380	
Production calibration for DN 50 DN 1200 with $Q_n$ as selected in diameter. Incl. Calibration protocol: 2 x 3 points, $Q_i$ , 10 % $Q_p$ and $Q_p$ (max. 8000 m <sup>3</sup> /h).	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 DN 200 with $Q_n$ as selected in diameter. Certificate: 2 x 5 points, $Q_{i_3}$ 5 %, 10 %, 50 % and 100 % of $Q_p$ (max. 630 m <sup>3</sup> /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 250 DN 600 with $\rm Q_n$ as selected in diameter. Certificate: 2 x 5 points, 5 %, 10 %, 50 % and 100 % of $\rm Q_p$ (max. 2800 m <sup>3</sup> /h).	D21
Accredited Siemens ISO/IEC 17025 calibration, DN 500 DN 1200 with $Q_n$ as selected in diameter. Certificate: 2 x 5 points, $Q_{i_0}$ 5 %, 10 %, 50 % and 100 % of $Q_p$ (max. 8000 m <sup>3</sup> /h).	D22
Output B as reverse flow pulses. No calibration/verification of this function.	E21
Material certificate	
EN 10204-3.1 (pipe material)	F10
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	Y17

# PA-Selector\*

Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

# Flowmeter SITRANS FUS380 operating instructions, accessories and spare parts

#### Operating instructions

Article No.
A5E00730100
A5E00740611
A5E00754188
A5E00754173

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

For accessories and spare parts see chapter of transmitter SITRANS FUS080/FUE080 on page 3/254.

#### Overview



The 2-path flowmeter SITRANS FUE380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants and other general water applications.

The flowmeter FUE380 is approved according to energy meter standards EN 1434 class 2, OIML R 75 class 2 and MID class 2. Metrological parameters are protected against manipulation. The type-approved flowmeter version is named SITRANS FUE380. For a standard flowmeter type FUS380 without a type approval, see separate FUS380 chapter.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

#### Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- · 2-path measuring principle for optimum accuracy
- · Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q<sub>i</sub>:Q<sub>p</sub> up to 1:50/100 or max. range Qi:Qs up to 1:400

#### Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in energy meter systems for custody transfer in district heating networks or chilled water. Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system. For this purpose Siemens offers energy calculator SITRANS FUE950.

#### Design

The 2-path design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The approved flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080.

The unit is available in a compact or a remote version with up to 30 meter distance from flowmeter to transmitter. When ordering a compact version the transducer cables are pre-mounted and ready for installation.

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

#### FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international energy meter standard EN 1434. On 1 November 2006 the MI-004 energy meter directive became effective providing that all energy meters with a MI-004 verification label can be sold across the EU borders.

The FUE380 are MI-004 verified and labeled products according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-004, in sizes from DN 50 to DN 1200.

The MID certification is obtained as module B + module D approvals according to the above-mentioned directive.

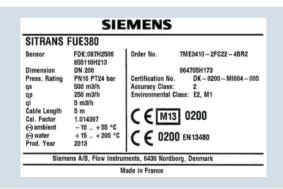
Module B: MI-004 Type MID approval according to EN 1434: 2007

Module D: Quality insurance MID approval of production

The MID system label with the approval information is placed on the side of the transmitter and on the sensor. An example of the product label is shown below:



FUE380 transmitter label (with MID first verification)



FUE380 sensor label (with MID first verification)

SITRANS F US Inline

#### Flowmeter SITRANS FUE380 with CT approval

#### Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUE380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

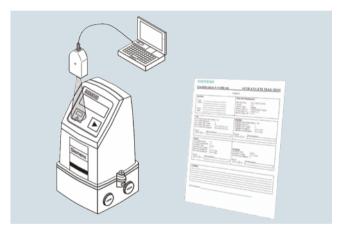
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

#### Function

Together with the SIMATIC PDM tool the FUE380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- general settings, flowmeter and battery information, totalizer values, and pulse output settings
- detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



## Configuration SITRANS FUE380 type-approved

#### Selection guide SITRANS FUE380, type-approved flowmeter

DN	Q <sub>s</sub> (m <sup>3</sup> /h)	Q <sub>max</sub> (m <sup>3</sup> /h (105 % of Q <sub>s</sub> )	Q <sub>p</sub> (m <sup>3</sup> /h)	Q <sub>i</sub> (m <sup>3</sup> /h) (1:50 of Q <sub>p</sub> ) <sup>4)</sup>	Q <sub>i</sub> (m <sup>3</sup> /h) (1:100 of Q <sub>p</sub> ) <sup>4)</sup>	Cut-off (m <sup>3</sup> /h)	Cut-off (% of Q <sub>max</sub> )	Typical pulse value <sup>5)</sup> (I/pulse)
50	30	31.5	15 <sup>2)</sup>	0.3	-	0.075	0.24	1
50	45	47.25	15 <sup>2)</sup>	0.3	-	0.075	0.16	1
50	45	47.25	30 <sup>3)</sup>	-	0.30	0.150	0.32	1
65	50	52.5	25 <sup>2)</sup>	0.5	-	0.125	0.24	1
65	72	75.6	25 <sup>2)</sup>	0.5	-	0.125	0.17	1
65	72	75.6	50 <sup>3)</sup>	-	0.50	0.250	0.33	1
80	80	84	40 <sup>2)</sup>	0.8	-	0.200	0.24	2.5
80	120	126	40 <sup>2)</sup>	0.8	-	0.200	0.16	2.5
80	120	126	80 <sup>3)</sup>	-	0.80	0.400	0.32	2.5
100	120	126	60 <sup>2)</sup>	1.2	-	0.300	0.24	2.5
100	180	189	60 <sup>2)</sup>	1.2	-	0.300	0.16	2.5
100	180	189	120 <sup>3)</sup>	-	1.20	0.600	0.32	2.5
125	200	210	100 <sup>2)</sup>	2.0	-	0.500	0.24	2.5
125	280	294	100 <sup>2)</sup>	2.0	-	0.500	0.17	2.5
125	280	294	200 <sup>3)</sup>	-	2.00	1.000	0.34	2.5
150	300	315	150 <sup>2)</sup>	3.0	-	0.750	0.24	10
150	420	441	150 <sup>2)</sup>	3.0	-	0.750	0.17	10
150	420	441	300 <sup>3)</sup>	-	3.00	1.500	0.34	10
200	500	525	250 <sup>2)</sup>	5.0	-	1.250	0.24	10
200	700	735	250 <sup>2)</sup>	5.0	-	1.250	0.17	10
200	700	735	500 <sup>3)</sup>	-	5.00	2.500	0.34	10
250	800	840	400 <sup>2)</sup>	8.0	-	2.000	0.24	10
250	1 120	1 176	400 <sup>2)</sup>	8.0	-	2.000	0.17	10
250	1 120	1 176	800 <sup>3)</sup>	-	8.00	4.000	0.34	10
300	1 120	1 176	560 <sup>2)</sup>	11.2	-	2.800	0.24	50
300	1 560	1 638	560 <sup>2)</sup>	11.2	-	2.800	0.17	50
300	1 560	1 638	1120 <sup>3)</sup>	-	11.20	5.600	0.34	50
350	1 500	1 575	750 <sup>2)</sup>	15.0	-	3.750	0.24	50
350	2 100	2 205	750 <sup>2)</sup>	15.0	-	3.750	0.17	50
350	2 100	2 205	1 500 <sup>3)</sup>	-	15.00	7.500	0.34	50
400	1 900	1 995	950 <sup>2)</sup>	19.0	-	4.750	0.24	50
400	2 660	2 793	950 <sup>2)</sup>	19.0	-	4.750	0.17	50
400	2 660	2 793	1 900 <sup>3)</sup>	-	19.00	9.500	0.34	50
500	2 950	3 097.5	1 475 <sup>2)</sup>	29.5	-	7.375	0.24	100
500	4 130	4 336.5	1 475 <sup>2)</sup>	29.5	-	7.375	0.17	100
500	4 130	4 336.5	2 950 <sup>3)</sup>	-	29.50	14.750	0.34	100
600	4 300	4 515	2 150 <sup>2)</sup>	43.0	-	10.750	0.24	100
600	6 020	6 321	2 150 <sup>2)</sup>	43.0	-	10.750	0.17	100
600	6 020	6 321	4 300 <sup>3)</sup>	-	43.00	21.500	0.34	100
700	5 800	6 090	2 900 <sup>2)</sup>	58.0	-	14.500	0.24	100
700	8 120	8 526	2 900 <sup>2)</sup>	58.0	-	14.500	0.17	100
700	8 120	8 526	5 800 <sup>3)</sup>	-	58.00	29.000	0.34	100
800	7 600	7 980	3 800 <sup>2)</sup>	76.0	-	19.000	0.24	100
800	10 640	11 172	3 800 <sup>2)</sup>	76.0	-	19.000	0.17	100
800	10 640	11 172	7 600 <sup>3)</sup>	-	76.00	38.000	0.34	100
900	10 000	10 500	5 000 <sup>2)</sup>	100.0	-	25.000	0.24	100
900	14 000	14 700	5 000 <sup>2)</sup>	100.0	-	25.000	0.17	100
900	14 000	14 700	10 000 <sup>3)</sup>	-	100.00	50.000	0.34	100

SITRANS F US Inline

#### Flowmeter SITRANS FUE380 with CT approval

DN	Q <sub>s</sub> (m <sup>3</sup> /h)	Q <sub>max</sub> (m <sup>3</sup> /h (105 % of Q <sub>s</sub> )	Q <sub>p</sub> (m <sup>3</sup> /h)	Q <sub>i</sub> (m <sup>3</sup> /h) (1:50 of Q <sub>p</sub> ) <sup>4)</sup>	Q <sub>i</sub> (m <sup>3</sup> /h) (1:100 of Q <sub>p</sub> ) <sup>4)</sup>	Cut-off (m <sup>3</sup> /h)	Cut-off (% of Q <sub>max</sub> )	Typical pulse value <sup>5)</sup> (I/pulse)
1 000	12 000	12 600	6 000 <sup>2)</sup>	120.0	-	30.000	0.24	100
1 000	16 800	17 640	6 000 <sup>2)</sup>	120.0	-	30.000	0.17	100
1 000	16 800	17 640	12 000 <sup>3)</sup>	-	120.00	60.000	0.34	100
1 200	18 000	18 900	9 000 <sup>2)</sup>	180.0	-	45.000	0.24	100
1 200	25 200	26 460	9 000 <sup>2)</sup>	180.0	-	45.000	0.17	100
1 200	25 200	26 460	18 000 <sup>3)</sup>	-	180.00	90.000	0.34	100

Dynamic range Q<sub>i</sub>:Q<sub>p</sub>: better than 1:100 or 1:50 according to OIML R 75 class 2 and MID EN 1434 class 2.

Qi  $(Q_{min})$  means the minimal and  $Q_p$   $(Q_{nom})$  the nominal flow rate according to the approval requirements.  $Q_s$  is the highest operatable flow rate. The maximum flow rate  $(Q_{max})$  is 105 % of  $Q_s$ . The low flow cut-off is 50 % of  $Q_i$ .  $Q_i$ ,  $Q_p$  and  $Q_s$  are shown on the system nameplate of the FUE380.

In order to obtain best pulse output resolution in the range  $Q_{min}$  to  $Q_s$  of approx. 100 Hz at  $Q_s$ , two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows  $Q_p(Q_n)$ . This flow rate is between  $Q_i(Q_{min})$  and Q<sub>s</sub> and indicates the normal or typical flow according to the approval requirements.

<sup>1)</sup> Typical pulse values with a pulse length of 5 ms in connection with SITRANS FUE950. Other values are possible, please see the selections at the 7ME341 Order code.

<sup>2)</sup> EN 1434 and MID flow values

<sup>3)</sup> OIML R 75 and MID flow values

 $<sup>^{4)}</sup>$  The minimum flow (Q<sub>i</sub>) should be checked in the PIA-portal or product master data base (PMD)

<sup>5)</sup> To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse >  $Q_s$  (m³/h) /360. For example  $Q_s$  = 300 m³/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

#### Flowmeter SITRANS FUE380 with CT approval

Tankainal annaitiantiana	
Technical specifications	O made a second state flavores and
Pipe design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size welded version (DN 50 DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200 • type 11 (B) 'design': DN 50 to DN 80
Pipe material	<ul> <li>DN 100 DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray.</li> <li>DN 50 DN 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)</li> </ul>
Transducer design	<ul> <li>DN 100 DN 1200: Inline version and welded onto the pipe</li> <li>DN 50 DN 80: Screwed into the pipe</li> </ul>
Transducer material	Stainless steel (AISI 316/1.4404)/ brass (CuZn <sub>36</sub> Pb <sub>2</sub> As)
Sensor operating conditions	
Ambient temperature	
Operation	-10 +60 °C (14 140 °F) (MID version: -10 +55 °C (14 131 °F))
Storage	-40 +85 °C (-40 +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	
• DN 100 DN 1200	Remote: 2 200 °C (35.6 392 °F) MID: min. +15 °C/+59 °F
• DN 50 DN 80	Remote: 2 150 °C (35.6 302 °F) MID: min. +15 °C/+59 °F
• DN 50 DN 1200	Compact: 2 120 °C (35.6 248 °F) MID: min. +15 °C/+59 °F
Degree of protection	Sensor connection IP67/NEMA 4X/6
Electromagnetic compatibility	
Emitted interference	To EN 55011/CISPR-11
Noise immunity	To EN/IEC 61326-1 (Industry)
• MID	Environment class E2 and M1
Max. flow velocity at $\mathbf{Q}_{\mathrm{S}}$	DN 50 DN 1200: 9 m/s (29.5 ft/s)

Calibration report	A standard calibration report is shipped with every flowmeter.
	Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	<ul> <li>Approval standards: EN 1434 and OIML R 75 Class 2</li> </ul>
	<ul> <li>Type approval: MID, MI-004, class 2 approval and certification (according to FN 1434)</li> </ul>

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

#### Type-dependent settings

Flow value	Predefined according to EN 1434/ OIML R 75/MID
Approval	Country specific
Flow rate v <sub>f</sub>	0.02 9 m/s (0.065 29.5 ft/s)
Output A	Preset: Forward pulses
Output B	Preset: Alarm
Pulse value A & B (depending on DN value)	Preset: See scheme - previous page Preset for SITRANS FUE950 or free selectable depending on flow rate $(Q_s)$
Pulse width	Preset: 5 ms
Flow unit setup	Preset: m <sup>3</sup> /h
Volume unit setup	Preset: m <sup>3</sup>

#### Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m<sup>3</sup>/h to 10 000 m<sup>3</sup>/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with  $Q_n$  as selected flow is shipped with each SITRANS FUE380. This production calibration protocol consists of 2 x 3 points at  $Q_i$ , 10 %  $Q_p$  and  $Q_p$  (max. 4 200 m<sup>3</sup>/h).

#### Transmitter

The transmitter related to this system is the SITRANS FUE080. Technical specifications to the FUE080 see page 3/251 ff.

Sensor cable			
Cable length	Max. 30 m (98.4 ft) between transmitter and sensor		
Certificates and approvals			
Conformity certificate	The devices are supplied as stan- dard with a Siemens Certificate of Conformity on CD		
Material certificate	Material certificate according EN 10204-3.1 is optionally available		

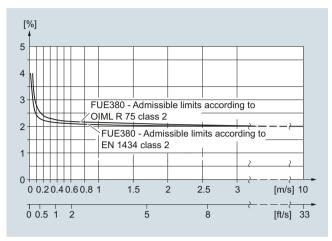
SITRANS F US Inline

#### Flowmeter SITRANS FUE380 with CT approval

#### Typical accuracy SITRANS FUE380:

 $\pm (0.5 + 0.02~Q_p/Q)~[\%]$   $Q_p$  according to EN 1434/OIML requirements.

Example: DN 100,  $Q_p = 60 \text{ m}^3/\text{h}$  at  $Q = 1.2 \text{ m}^3/\text{h}$ : Accuracy at 1.2 m $^3/\text{h} = \text{typical 1.5 \%}$ 



SITRANS FUE380 fulfils the requirements  $E_f=\pm$  (2 + 0.02  $Q_p/Q_i$ ) max.  $\pm$  5 %, according to EN 1434 and OIML R 75, class 2 or MID class 2 requirements.

#### Flowmeter SITRANS FUE380 with CT approval

Selection and Ord	lering data		Article No. Order code
Flowmeter SITRAI (type-approved)	NS FUE380		7ME3410-
,		l'	
Click on the Artification in the	PIA Life Cyc	ele Portal.	
Diameter	Flow sett	ing [m³/h] <sup>1)</sup> Qs [m³/h]	
DN 50 (2") <sup>2)</sup>	<b>Աթ</b> լա-/ոյ 15 <sup>3)</sup>	30	1B
DN 50 (2") <sup>2)</sup>	15 <sup>3)</sup>	45	1 C
DN 50 (2") <sup>2)</sup>	30 <sup>4)</sup>	45	1D
DN 65 (2½") <sup>2)</sup> DN 65 (2½") <sup>2)</sup>	25 <sup>3)</sup> 25 <sup>3)</sup>	50 72	1 F 1 G
DN 65 (2½") <sup>2)</sup>	50 <sup>4)</sup>	72	1 H
DN 80 (3") <sup>2)</sup> DN 80 (3") <sup>2)</sup>	40 <sup>3)</sup> 40 <sup>3)</sup>	80	1 K
DN 80 (3") <sup>2)</sup>	80 <sup>4)</sup>	120 120	1 L 1 M
DN 100 (4")	60 <sup>3)</sup>	120	1 P
DN 100 (4") DN 100 (4")	60 <sup>3)</sup> 120 <sup>4)</sup>	180 180	1 Q 1 R
DN 125 (5")	100 <sup>3)</sup>	200	1 T
DN 125 (5")	100 <sup>3)</sup> 200 <sup>4)</sup>	280	10
DN 125 (5") DN 150 (6")	200 <sup>-7</sup> 150 <sup>3)</sup>	280 300	1 V 2 B
DN 150 (6")	150 <sup>3)</sup>	420	2 C
DN 150 (6")	300 <sup>4)</sup>	420	2 D
DN 200 (8") DN 200 (8")	250 <sup>3)</sup> 250 <sup>3)</sup>	500 700	2 F 2 G
DN 200 (8")	500 <sup>4)</sup>	700	2 H
DN 250 (10") DN 250 (10")	400 <sup>3)</sup> 400 <sup>3)</sup>	800 1 120	2 K
DN 250 (10")	800 <sup>4)</sup>	1 120	2 L 2 M
DN 300 (12")	560 <sup>3)</sup>	1 120	2 P
DN 300 (12") DN 300 (12")	560 <sup>3)</sup> 1 120 <sup>4)</sup>	1 560 1 560	2 Q 2 R
DN 350 (14")	750 <sup>3)</sup>	1 500	2 T
DN 350 (14")	750 <sup>3)</sup> 1 500 <sup>4)</sup>	2 100 2 100	2 U
DN 350 (14") DN 400 (16")	950 <sup>3)</sup>	1 900	2 V 3 B
DN 400 (16")	950 <sup>3)</sup>	2 660	3 C
DN 400 (16")	1 900 <sup>4)</sup>	2 660	3 D
DN 500 (20") DN 500 (20")	1 475 <sup>3)</sup> 1 475 <sup>3)</sup>	2 950 4 130	3 K 3 L
DN 500 (20")	2 950 <sup>4)</sup>	41 30	3 M
DN 600 (24") DN 600 (24")	2 150 <sup>3)</sup> 2 150 <sup>3)</sup>	4 300 6 020	3 T 3 U
DN 600 (24")	4 300 <sup>4)</sup>	6 020	3 V
DN 700 (28")	2 900 <sup>3)</sup> 2 900 <sup>3)</sup>	5 800	4 F
DN 700 (28") DN 700 (28")	2 900 <sup>4</sup> )	8 120 8120	4 G 4 H
DN 800 (32")	3 800 <sup>3)</sup>	7 600	4 P
DN 800 (32") DN 800 (32")	3 800 <sup>3)</sup> 7 600 <sup>4)</sup>	10 640 10 640	4 Q 4 R
DN 900 (36")	5 000 <sup>3)</sup>	10 000	5 B
DN 900 (36") DN 900 (36")	5 000 <sup>3)</sup> 10 000 <sup>4)</sup>	14 000 14 000	5 C 5 D
DN 1000 (40")	6 000 <sup>3)</sup>	12 000	5 K
DN 1000 (40")	6 000 <sup>3)</sup>	16 800	5 L
DN 1000 (40") DN 1200 (48")	12 000 <sup>4)</sup> 9 000 <sup>3)</sup>	16 800 18 000	5 M 5 T
DN 1200 (48")	9 000 <sup>3)</sup>	25 200	5 U
DN 1200 (48")	18 000 <sup>4)</sup>	25 200	5 V

Selection and Ordering data	Article No. Order code	9
Flowmeter SITRANS FUE380	7ME3410-	
(type-approved)		
Flange norm and pressure rating		
System without sensor - only a transmitter		
EN 1092-1		
PN 16 (DN 100 DN 1 200)	С	
PN 25 (DN 200 DN 1 000)	D	
PN 40 (DN 50 DN 250) <sup>5)</sup>	. E	
Compact/remote connection		
Compact version, max. 120 °C (248 °F)	0	
Remote version, max. 150/200 °C (302/392 °F) 5 m (16.4 ft)	2	
10 m (32.8 ft)	3	
20 m (65.6 ft)	4	
30 m (98.4 ft)	5	
Approvals/pulse output		
Without approval (neutral) Selectable pulse output	0	
With approval marks	1	
Selectable pulse output		
With approval marks and seal Selectable pulse output	2	
Pulse output value setup <sup>8)</sup>		
0.1 l/p 1 l/p	1 2	
2.5 l/p	3	
10 l/p	4	
50 l/p	5	
100 l/p	6	
250 l/pulse	7	
1 m <sup>3</sup> /pulse	8	
0.25 l/pulse	9 N O A	١
0.5 l/pulse	9 N O E	
5 l/pulse 25 l/pulse	9 NOC 9 NOC	
500 l/pulse	9 NOE	
2.5 m <sup>3</sup> /pulse	9 NOF	
5 m <sup>3</sup> /pulse	9 NOG	
10 m <sup>3</sup> /pulse	9 NOF	1
25 m <sup>3</sup> /pulse	9 N O J	
50 m <sup>3</sup> /pulse	9 N O F	
100 m <sup>3</sup> /pulse	9 NOL	
250 m <sup>3</sup> /pulse 500 m <sup>3</sup> /pulse	9 NON 9 NON	
1 000 m³/pulse	9 NOF	
i ooo iii /puise	9 NUF	

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

For notes 1) to 8) see next page

#### SITRANS F US Inline

#### Flowmeter SITRANS FUE380 with CT approval

Selection and Ordering data	Article No.	Order code
Flowmeter SITRANS FUE380	7ME3410	
(type-approved)		
Transmitter SITRANS FUE080		
IP67/NEMA 4X/6 115 230 V AC		В
IP67/NEMA 4X/6 3.6 V battery version,		D
incl. dual battery pack <sup>6)</sup>		
IP67/NEMA 4X/6 115 230 V AC, including 3.6 V single battery backup <sup>6)</sup>		E
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)		G
Country/approval type <sup>7)</sup>		
Neutral, no approval mark		A
China		С
Russia, EN 1434/OIML R 75		M
MID-Approval, (EN 1434/OIML R 75), English		R
MID-Approval, (EN 1434/OIML R 75), German		S
MID-Approval, (EN 1434/OIML R 75), Polish		Т
MID-Approval, (EN 1434/OIML R 75), French		U
Pulse width setup		
5 ms (standard)		2
10 ms		3
20 ms		4
50 ms		5
100 ms		6
200 ms 500 ms		7 8
300 IIIS		0

- $^{1)}~Q_p~(Q_n)$  is the normal flow according to the approval requirements.  $Q_p$  and  $Q_s$  is shown on the system label.
- <sup>2)</sup> Pipe material bronze brass
- 3) EN 1434 flow values. The minimum flow (Q<sub>i</sub>) should be checked in the PIA-portal or product master data base (PMD).
- 4) OIML R 75/EN1434 flow values without PTB approval
- <sup>5)</sup> PN 40 standard for DN 50 ... DN 80 die-cast bronze pipes
- 6) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- 7) Other countries in progress
- 8) To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse >  $Q_s$  (m³/h) /360. For example  $Q_s$  = 300 m³/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

Selection and Ordering data	Order code
Additional information	
Please add " <b>-Z</b> " to Article No. and following add-on code(s) with plain text.	
Calibration/certificate FUE380	
Approval, verification and approval sealing as defined with the article number. See Order code.	
Production calibration for DN 50 DN 1200 with $Q_n$ as selected in diameter Incl. Calibration protocol: 2 x 3 points, $Q_i$ , 10 % $Q_p$ and $Q_p$ (max. 8000 m <sup>3</sup> /h).	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 DN 200 with $Q_n$ as selected in diameter. Certificate: 2 x 5 points, $Q_i$ , 5 %, 10 %, 50 % and 100 % of Qp (max. 630 m $^3$ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 250 DN 600 with $Q_{\rm n}$ as selected in diameter. Certificate: 2 x 5 points, $Q_{\rm i}$ , 5 %, 10 %, 50 % and 100 % of $Q_{\rm p}$ (max. 2800 m³/h).	D21
Accredited Siemens ISO/IEC 17025 calibration, DN 500 DN 1200 with $\rm Q_n$ as selected in diameter. Certificate: 2 x 5 points, $\rm Q_i$ , 5 %, 10 %, 50 % and 100 % of Qp (max. 8000 m³/h).	D22
Output B as reverse flow pulses. No calibration/verification of this function.	E21
Material certificate	
EN 10204-3.1 (pipe material)	F10
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 10 characters, 4 mm for 11 20 characters (specify in plain text).	Y17

#### Flowmeter SITRANS FUE380 operating instructions, accessories and spare parts

#### Operating instructions

, ,	
Description	Article No.
• English	A5E00730100
German	A5E00740611
• Spanish	A5E00754188
• French	A5E00754173

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

For accessories and spare parts on page 3/254 see chapter of transmitter FUS080/FUE080.

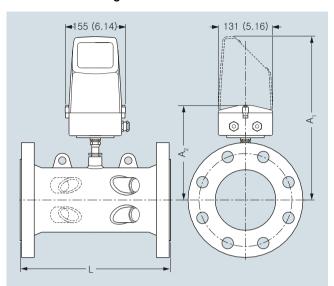


Please use online Product selector to get latest

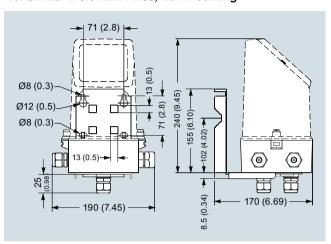
Product selector link:

www.pia-portal.automation.siemens.com

## Dimensional drawings



#### Transmitter IP67/NEMA 4X/6, wall mounting



Dimensions in mm (inch)

#### Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40						
	L	Weight	L	Weight	L	Weight	A <sub>1</sub>	$A_2$	Lift hug		
DN	mm	kg	mm	kg	mm	kg	mm	mm			
50	-	-	-	-	300 +0/-2	10	350	196	No		
65	-	-	-	-	300 +0/-2	15	360	206	No		
80	-	-	-	-	350 +0/-3	18	370	216	No		
100	350 +0/-2	15	-	-	350 +0/-3	18	375	221	No		
125	350 +0/-2	18	-	-	350 +0/-3	24	380	226	No		
150	500 +0/-3	28	-	-	500 +0/-3	34	390	236	No		
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	414	260	No		
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	440	286	No		
300	500 +0/-3	66	500 +0/-3	81	-	-	466	312	Yes		
350	550 +0/-3	94	550 +0/-3	121	-	-	495	341	Yes		
400	600 +0/-3	124	600 +0/-3	153	-	-	507	353	Yes		
500	625 +0/-3	194	625 +0/-3	231	-	-	558	404	Yes		
600	750 +0/-3	303	750 +0/-3	365	-	-	609	455	Yes		
700	875 +0/-3	361	875 +0/-3	553	-	-	660	506	Yes		
800	1000 +0/-3	494	1000 +0/-3	770	-	-	710	556	Yes		
900	1230 +6/-6	475	1300 +6/-6	835	-	-	760	606	Yes		
1000	1300 +6/-6	594	1370 +6/-6	1000	-	-	810	656	Yes		
1200	1360 +6/-6	732	-	-	-	-	910	756	Yes		

#### Notes:

- Weight for transmitter/electronics 1.5 kg (compact version) or approximately 5 kg (remote version including 10 m cable set)
   Means not available
- All weigths are approximate
- For flange values see norm EN 1092-1

SITRANS F US Inline

#### Flowmeter SITRANS FUS380 and FUE380

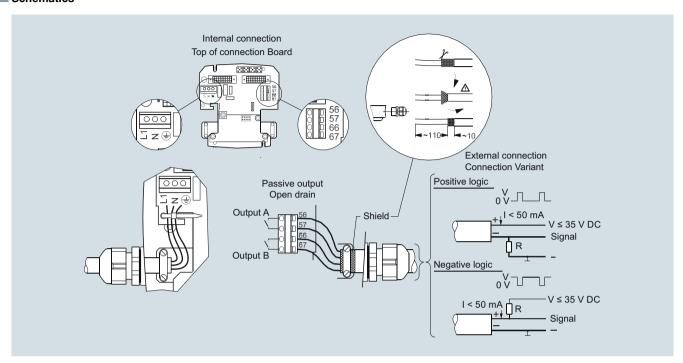
Size	PN 16	PN 16		PN 25 PN 40					
	L	Weight	L	Weight	L	Weight	$\mathbf{A}_{1}$	A <sub>2</sub>	Lift hug
inch	inch	lb	inch	lb	inch	lb	inch	inch	
2	-	-	-	-	11.81 +0/-0.08	22	13.78	7.72	No
21/2	-	-	-	-	11.81 +0/-0.08	33	14.17	8.11	No
3	-	-	-	-	13.78 +0/-0.08	40	14.57	8.51	No
4	13.78 +0/-0.08	33	-	-	13.78 +0/-0.12	40	14.76	8.70	No
5	13.78 +0/-0.08	40	-	-	13.78 +0/-0.12	53	14.96	8.90	No
6	19.68 +0/-0.12	62	-	-	19.68 +0/-0.12	75	15.35	9.29	No
8	19.68 +0/-0.12	84	19.68 +0/-0.12	104	19.68 +0/-0.12	121	16.30	10.24	No
10	23.62 +0/-0.12	132	23.62 +0/-0.12	168	23.62 +0/-0.12	201	17.32	11.26	No
12	19.68 +0/-0.12	146	19.68 +0/-0.12	179	-	-	18.35	12.29	Yes
14	21.65 +0/-0.12	207	21.65 +0/-0.12	267	-	-	19.49	13.43	Yes
16	23.62 +0/-0.12	273	23.62 +0/-0.12	337	-	-	19.96	13.90	Yes
20	24.61 +0/-0.12	428	24.61 +0/-0.12	509	-	-	21.97	15.91	Yes
24	29.53 +0/-0.12	668	29.53 +0/-0.12	805	-	-	23.98	17.92	Yes
28	34.45 +0/-0.12	796	34.45 +0/-0.12	1246	-	-	25.98	19.92	Yes
32	39.37 +0/-0.12	1089	39.37 +0/-0.12	1698	-	-	27.95	21.89	Yes
36	48.43 +0/-0.24	1047	51.18 +0/-0.24	1841	-	-	29.92	23.86	Yes
40	51.18 +0/-0.24	1310	53.94 +0/-0.24	2205	-	-	31.89	25.83	Yes
48	53.54 +0/-0.24	1614	-	-	-	-	35.83	29.77	Yes

#### Notes:

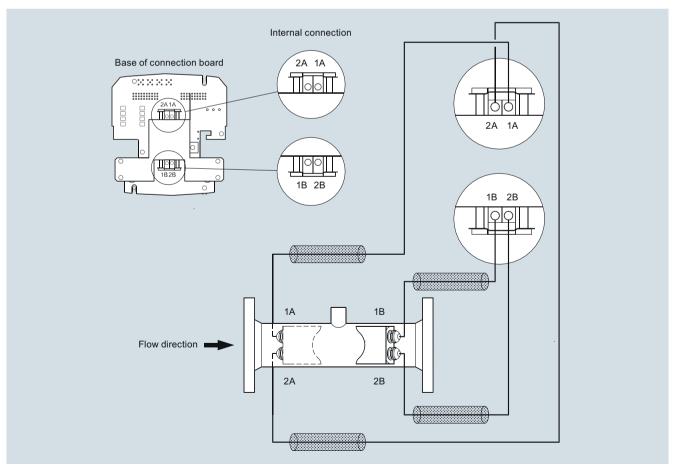
- Weight for transmitter/electronics 3.3 lb (compact version) or approximately 11 lb (remote version including 32.8 ft cable set)
   Means not available
  All weights are approximate
  For flange values see norm EN 1092-1

#### Flowmeter SITRANS FUS380 and FUE380

## Schematics



Electrical connection of transmitter SITRANS FUS/FUE380



Electrical connection of sensor SITRANS FUS/FUE380

SITRANS F US Inline

#### SITRANS FUE950 energy calculator

#### Overview



SITRANS FUE950 is a universal thermal energy calculator, which meets the requirements EN 1434 and has the MID and PTB K7.2 approval for energy metering with the media water.

SITRANS FUE950 has been developed for the SITRANS FUS380/FUE380 and alternatively MAG 5000/6000 or FST020. SITRANS FUE950 is modular in construction and can by order be fitted with optional modules depending on the application. The FUE950 supports none of the SITRANS FX, FC products and only some of the FUS clamp-on products.

#### Benefits

#### Basic functions

- Prepared for heating, cooling measurement
- Approval for MID for heat metering and PTB K7.2 for cooling
- High-accuracy thermal energy metering, meets EN1434 requirements
- Measured temperature range -20 ... +190 °C (-4 ... +374 °F)
- · Instantaneous values for energy/volume flow
- Battery or mains powered
- Battery version with battery lifetime of typically up to 10 years
- · Optical data interface
- Real date and time
- Auto-detection of 2-wire or 4-wire temperature sensors

#### Additional functions

- · Individual tariff functions
- Advanced functions for cooling/heating applications or the combination
- Memory for 24 periods (months, weeks, days)
- · Data logger function
- Expandable functionality with 2 optional plug and play add-on modules
- Communication over M-Bus, RS 485 or RS 232

#### Add-on modules

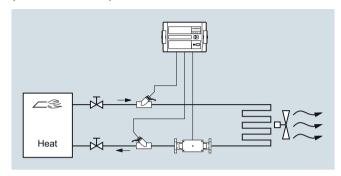
- Plug-in module with 2 extra pulse inputs
- Plug-in module with 2 pulse outputs
- Plug-in module with combination of input and output pulses
- Plug-in module for M-Bus communication
- Plug-in module for RS 232 or RS 485 communication
- Plug-in module with 2 passive current outputs (4 ... 20 mA)

#### Application

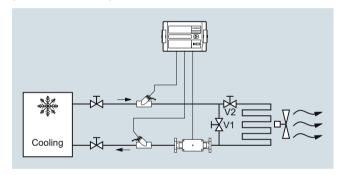
The SITRANS FUE950 is able to handle 3 kinds of applications, means energy calculation in:

- District heating applications
- · Chilled water applications
- Combined cooling/heating applications

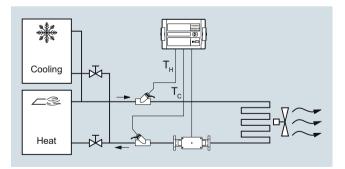
## Energy metering in heating, hot water applications (code "A" and "B")



## Energy metering in cooling, chilled water applications (code "C" and "D")



## Energy metering in combined cooling/heating applications (code "E" and "F")



#### SITRANS FUE950 energy calculator

#### Design

SITRANS FUE950 has an easy-read 8-digit LCD display with associated pictograms for the various functions. As the display has been made for several applications, some figures/symbols not used for normal district heating applications will be shown.

SITRANS FUE950 has a push button for simple operation and provides user-friendly control via the various display menu loops. The display will always be configured for the application chosen, and for the selected display settings.

The integrator has an IP54 plastic housing and is designed for wall or panel mounting. The housing comes with prepared rubber gaskets cable entries for fast and easy installation.

#### Operation menu loop structure

The FUE950 display has six menu loops and the menus are numbered in the display from 1 to 6. Some display menus consist of two values (to maximum seven) that are shown alternately at 4-second intervals

The main menu loop no. 1 with the current data, e.g. for energy, volume, flow rate and temperature, is preprogrammed as default setting.

In the combined heating/cooling configuration the menu loop no. 5 (tariff menu loop) will be activated additionally.

#### Display and output pulses

Units: MWh, GJ, Gcal, MBtu,  $m^3$ , gal,  $m^3/h$ , GPM, °C, °F and kW; all decimal points are statically (the unit "gal" is shown with factor x 100).

The display unit and the last fractional digit are typical used for the pulse outputs.

#### Function

#### Technical principle

Calculation of energy is based on the following formula:

Energy = Volume x  $(T_{Hot} - T_{Cold})$  x  $K_{factor}$   $(T_i)$ 

Volume: Volume [m³] of a given amount of volume pulses

T<sub>Hot</sub>: Measured temperature in the hot line

T<sub>Cold</sub>: Measured temperature in the cold line

K<sub>factor</sub> (T<sub>i</sub>): Thermal coefficient of media enthalpy and heat

The energy calculation is made by a counter and depends on temperature difference, pulse input frequency and legal requirements.

The calculator always carries out at least one energy calculation every 2 seconds. If the connected flowmeter has not sent enough pulses the energy calculation and flow indication is also based on the 8 seconds value.

#### Data memory

The FUE950 has a history memory of 24 periods (months, weeks, days). The following values are stored monthly, weekly or daily in the EEPROM on the programmed day of 1...31 (via software tool).

- Date/Time
- Volume
- Energy
- Error day counter
- Tariff energy 1
- 2.10. day 000.10.
- Tariff energy 2
- Maximum monthly flow rate
- ... . . . . . .
- Maximum monthly power
- Tariff definition 1
- Date of maximum monthly flow rateDate of maximum monthly power
- Tariff definition 2
- Pulse counter input 2
- Pulse counter input 1Operation hours

#### Data logger memory (LOG)

The LOG of the calculator is stored every 24 hours with all cumulative values in the EEPROM. The storage frequency can be selected from various storage intervals (5, 6, 10, 12, 15, 20, 30, 60 minutes or the default setting of 24 hours). The data which are stored in the LOG could be read out using a software tool and can be used for evaluations.

#### Extract of possible LOG settings

•	•		
Storage interval	Values	Number of data records	Recording period
5 minutes	• Error status	440	36.6 hours
15 minutes	<ul> <li>Overload time tem- perature</li> </ul>	440	110 hours
1 hour	<ul> <li>Overload time flow rate</li> </ul>	440	18.3 days
24 hours (default setting)	Fare Forward temperature Return temperature Date and time Energy Tariff energy 1 Tariff energy 2 Tariff definition 1 Tariff definition 2 Volume Error day counter	440	440 days

#### Maximal Values

The integrator creates max. values for power and flow rate based on consumption time, which are stored in the EEPROM. The integration intervals are adjustable to 6, 15, 30 or 60 minutes and 24h. Default setting is 60 minutes.

#### Tariff/Accounting date function

The calculator includes two independent memories in which the accumulated energy at two programmable tariff dates are stored.

- · Last accounting date
- Last but one accounting date

#### Values stored

- Energy
- Volume
- Tariff counter 1
- Tariff counter 2
- Pulse counter 1
- Pulse counter 2
- Date

The integrator offers two optional tariff memories for monitoring plant load states. Here it concerns threshold value tariffs. Extensive tariff conditions make it possible to adapt the calculator individually to the required customer-specific applications.

Both tariffs are separately configurable and independent from each other. Energy or time can be measured alternatively per tariff register dependent on the tariff mode adjusted in each case.

With the "time triggered tariff function" the switch-on time and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

#### SITRANS F US Inline

#### SITRANS FUE950 energy calculator

The following tariff limit types of the tariff function are possible: (This example applies to the display at 1 fractional digits after comma)

Description	Limit	Limit resolution
Temperature difference	1 190 °C	1 °C
Negative temperature difference	1 190 °C	1 °C
Return temperature (low)	1 190 °C	1 °C
Forward temperature (high)	1 190 °C	1 °C
Power	10 2 500 kW	10 kW
Flow	1 255 m <sup>3</sup> /h	1 m <sup>3</sup> /h
"Theoretically forward energy" with return temperature of 0 °C		
"Time triggered" counting energy		
"External" counting energy		
	Negative temperature difference Return temperature (low) Forward temperature (high) Power Flow "Theoretically forward energy" with return temperature of 0 °C "Time triggered" counting energy	Temperature difference 1 190 °C Negative temperature difference 1 190 °C Return temperature (low) 1 190 °C Forward temperature (high) 1 190 °C Power 10 2 500 kW Flow 1 255 m³/h "Theoretically forward energy" with return temperature of 0 °C "Time triggered" counting energy

#### Error handling and memory

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 127 entries. The following events are recorded:

- Checksum error
- Temperature measurement error
- · Error hours
- · Start and end of test mode

If SITRANS FUE950 records an error, this will be automatically indicated by a "alarm symbol" on the display.

To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

The following events are recorded:

- Temperature sensor error
- Swapped hot and cold temperature sensors
- · Battery low warning
- Power supply failure
- · Optical communication warning
- RAM checksum error

#### Outputs/Inputs/Communication

#### Communication interfaces:

SITRANS FUE950 is fitted with an optical infra-red send/receive port in accordance with EN1434/IEC 61107, protocol standard, EN 1434/EN 60870-3 (M-Bus protocol).

A specific optical head with a permanent magnet (IrDA-adapter) in accordance with EN 1434 can be used for readout data or communication with the parameterization software.

#### 2 ports for optionally plug-in modules

The calculator features 2 ports for the plug-in modules.

One slot is for the function modules and the other for the communication modules.

#### Communication modules

The following communication modules are available as options: RS 232 module, RS 485 module and M-Bus module. The RS 232 and RS 485 communication modules are serial interfaces and permit data exchange with the calculator. For this purpose a special data cable is necessary.

The M-Bus module is a serial interface for communication with external devices (M-Bus Master/Centre). According to the M-Bus structure a number of calculators can be connected to a control centre.

#### Pulse input module

Two pulse inputs are available. The pulse value and the unit is configurable for energy, water, gas or electrical meter by parameterization software. Data are separate cumulated in different registers and are also stored on the two accounting day's (Tariff registers).

#### Combined Pulse Input/Output module

Two pulse inputs combined with one pulse output are available on one module. The pulse inputs are configurable with value and the unit by parameterization software.

The pulse output is also programmable using the parameterization software.

#### Pulse output

The calculator provides levels for two optional external pulse outputs, which can be freely programmed using the parameterization software tool.

Default setting is one pulse which occurs per change in the least significant digit in the display with the unit and resolution selected by the device ordering.

Possible pulse output values

- Energy (default setting)
- Volume (default setting)
- Tariff energy 1
- Tariff energy 2
- · Tariff condition 1, limit switch
- · Tariff condition 2, limit switch
- Energy error
- Volume error
- Volume with specific resolution (0.1, 1.0, 10 or 100)
- Energy with specific resolution (0.1, 1.0, 10 or 100)

#### Combined current output module

Optional module with 2 passive 4 ... 20 mA outputs.

Possible output values:

- Power (default setting for output #1)
- Flow (default setting for output #2)
- Hot, cold or difference temperature

The settings can be configured by parameterization software. The current output module occupies both ports, means no other plug-in module will possible to plug in.

#### Module combinations

The calculator has a group of extension modules for communication and another group of extension modules for additional functionality. These modules are available first selected within the calculator, or for retrofitting in the field.

One single function module as well as one single communication module out of following modules is selectable.

Function modules:

- Pulse input module, 2 inputs
- Pulse output module, 2 outputs
- Combined pulse module 2 inputs, 1 output
- Combined current output module, 2 x passive 4 ... 20 mA (occupies both ports)

Communication modules:

- M-Bus (M-Bus protocol according EN 1434-3)
- RS 232 (M-Bus protocol according EN 1434-3)
- RS 485 (M-Bus protocol according EN 1434-3)

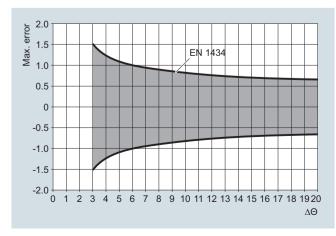
#### SITRANS FUE950 energy calculator

#### Integration

SITRANS FUE950 is a multi-purpose energy calculator for media water which meets the requirements of EN 1434. Further, the energy calculator has been specially developed to process volume pulses from SITRANS FUS380/FUE380 or alternatively MAG 5000/6000 or FST020 transmitter.

Technical specifications				
Approval	energy meter E	n accordance with N 1434 and PTB national cooling		
Approved temperature range				
Heating	0 180 °C (32	0 180 °C (32 356 °F)		
Cooling	0 105 °C (32 221 °F)			
Absolute temperature range	-20 +190 °C	-20 +190 °C (-4374 °F)		
Differential temperature				
Heating	3 177 K (star	rting at 0.1 K)		
• Cooling	3 102 K			
Measuring accuracy	Meets requirements of EN 1434 Typically max. $\pm$ (0.5 + 3K/ $\Delta\Theta$ ) [%] of measured value			
Measuring rates				
Battery type D-cell	Volume: 1 s, ter	Volume: 1 s, temperature: 4 s		
Mains versions	Volume: 1/8 s, t	temperature: 2 s		
Flow range	Depends on pulse input value (INO), see "Selection and Ordering data".			
Power range value	Depends on pu follows:	lse input value as		
	Pulse input value (I/P or gal/P)	Max power [kW]		
	1	15 000		
	2.5	15 000		
	5	15 000		
	10	150 000		
	25	150 000		
	50	150 000		
	100	1 500 000		
	250 *) 500 *)	1 500 000 1 500 000		
	1 000 *)	15 000 000		
	1 000 )	10 000 000		

#### Typical accuracy of FUE950



\*) not available for gal/pulse

User interface (always included)			
Display	8-digit LCD display with associated pictograms/symbols		
Units	MWh, GJ, Gcal, MBtu, m <sup>3</sup> , m <sup>3</sup> /h, GPM, gal, °C, °F, kW, MBtu/h (gal is shown with factor x 100)		
Totalizer value range	99 999 999 or 9 999 999.9 (0 and 1 digit after comma). Display dig- its: Flow in 6 digits; Volume, power and energy in 8 digits		
Values	Power, energy, volume, flow rate, temperatures		
Push button	Single push button for the menu controlling		
Optical interface IrDA interface	ZVEI optical interface with M-Bus protocol as per EN 1434, connection via separate IrDA-adapter baud rate: 300 or 2400		
Rated operation conditions			
Enclosure	IP54 in accordance with IEC 529		
Material			
• Housing	C Lexan 141R (or similar); colors: light gray (top part) and black (bottom part)		
Pipe/wall fitting	PA 6.6 GF25 (or similar)		
Other plastic parts	ABS Cycolac GPM500 (or similar		
Gaskets	Neoprene and rubber cable bushings: EPDM 50		
Rubber cable bushings	EPDM 50		
Temperature			
• Ambient	5 55 °C (41 131 °F)		
• Storage	-25 +70 °C (-13 +158 °F) Relative ambient humidity < 93 %		
Environment class			
Mechanic class	M1/M2		
• Electromagnetic class	E1/E2 (MID) or C (DIN EN 1434)		
Temperature input (always included)			
Function	The temperature sensors must be connected to terminals 1-5 and 6-2 (TH) and 3-7 and 8-4 (TC)		

	connected to terminals 1-5 and 6-2 (TH) and 3-7 and 8-4 (TC) depending on cable type (2-wire or 4-wire).
Temperature range Absolute measuring range	-20 190 °C (-4 374 °F) for $\rm T_H$ and $\rm T_C$
Temperature difference	Start 0.1 K, min. 3 K, max. 177 K
Measurement cut-off	0.125 K 16-bit digital resolution AD con- verter
Display resolution	$T_H$ and $T_C$ : 0.1 K , $\Delta T$ : 0.1 K
Sensor types	Pt100 or Pt500 as 2-wire or 4-

wire; Standard is Pt500. Sensor cable length: up to 10 m (according EN 1434 and MIDtype approval).

4-wire or 2-wire; auto detection of Sensor connection connection version

#### Flow input (IN0) (always included)

Function Used as standard for flow input of the external flowmeter. The input is marked as 10 (+ Flow Pulse), 11 (- Gnd) on the terminal strip.

Note: The pulse input value selection must be the same as the pulse output setting of the flowmeter.

#### SITRANS F US Inline

## SITRANS FUE950 energy calculator

SITRANS FUE950 energy ca	alculator		
Pulse value	1 1 000 l/pulse or 1 100 gal/pulse, selection by corresponding Order code. Will be	Possible pulse output selection	Energy (default setting for 'Out1')     Volume
D. I. (	shown at the device label		(default setting for 'Out2')
Pulse frequency	≤ 100 Hz (200 Hz)		• Tariff energy 1
Pulse ON-time	≥ 3 ms		Tariff energy 2     Tariff energy 1 (limit ewitch)
Pulse OFF-time	≥ 2 ms		<ul><li>Tariff condition 1 (limit switch)</li><li>Tariff condition 2 (limit switch)</li></ul>
Type	Active pulse input		• Energy error
Terminal voltage	3.6 V DC (supplied internally by FUE950)		Volume error
Flowmeter installation place	The flowmeter installation place can be in the hot line or cold line ("forward or return pipe") selected		<ul> <li>Volume with specific display resolution (or with factor 0, 1, 10 or 100 thereof)</li> </ul>
	by corresponding Order code. The "installation place" will be		<ul> <li>Energy with specific display resolution (or factor 0.1 thereof)</li> </ul>
	shown at the device display and	Pulse input	resolution (or factor of the reof)
	nameplate	Function	Add-on module for two additional
Connected cable	Max. 10 m (shielded cables are highly recommended)	ranoton	counters. The pulse input 1 is marked as I1, 'gnd' and the input
Ports for option modules			2 as I2, 'gnd' on the terminal strip and indicated in the display as
Type	The calculator features 2 ports for optional plug-in modules.		separate registers IN1 and IN2 and can also be transferred via the communication modules.
Function modules (Port 1 or 2)	<ul> <li>Pulse input module, 2 inputs (In1, In2)</li> </ul>	Туре	Passive "open collector" pulse
	<ul> <li>Pulse output module, 2 outputs (Out1, Out2)</li> </ul>	туре	inputs, outputs not potential iso- lated to each other, data are sep-
	<ul> <li>Combination module of 2 inputs (In1, In2) and 1 output (Out1)</li> </ul>		arate cumulated in different registers and are also stored on the two accounting day's.
Current output module (Port 1)	2 passive 4 20 mA (#1, #2) (occupies both port 1 and 2)	Pulse value	Pulse value and the unit are configurable for energy, water, gas or
Communication modules (Port 1 or 2)	M-Bus, RS 232 or RS 485 (M-Bus protocol, according EN 1434-3)		electrical meter by a software tool Default: Pulse input 0.1 m <sup>3</sup> or 1 gal (if unit 'gal' is ordered with
Pulse output			the Z-option "L05")
Function	The module contains connections for 2 pulse outputs, which can be	Pulse frequency	≤ 8 Hz
	programmed as desired using a software tool. The pulse outputs	Pulse length	≥ 10 ms
	are marked as standard as O1,	External voltage supply	3 V DC (supplied internally by FUE950)
	'gnd' and O2, 'gnd' on the termi- nal strip and Out1 respectively	Current	based on $R_i = 2.2 \text{ M}\Omega$
	Out2 in the display.	Cable length	< 10 m connection limit
Type Passive "open collector" pulse		Current output module	C 10 III GGIII GGIII III III
	output, outputs potential isolated to each other	Function	The module contains connections
Pulse value	Last significant digits of the dis- play (unit/pulse), selection by cor- responding Order code and setting can be read via display menu, settings changeable via software tool		for 2 passive current outputs, which can be programmed individually using the software tool. The outputs are marked "#1" and "#2" with corresponding polarity "+" and "-" on the terminal strip.
Pulse output 1			The module will be connected on
Pulse frequency	≤ 4 Hz		port 1 only, but both ports are occupied by the module.
Pulse width	125 ms ± 10 %	Terminal voltage	External supply: 10 30 V DC
Pulse duration	125 ms ± 10 %		(passive output)
Pulse break	≥125 ms -10 %	Signal range	4 20 mA; 4 mA = 0 value and 20 mA = default maximum values
Pulse output 2			(for #1: Power in kW and for #2:
• Pulse frequency	≤ 100 Hz, depending on the selected pulse length		Flow with the max. values and selected unit).  Defaults:
• Ratio	Pulse duration/pulse break ~1:1		For power it is the max. selectable
Pulse length	5, 10, 50, 100 ms (default: 5 ms)		value x 100 000 the last digit of display (e. g. 20 mA = 10 000 kW
External voltage supply	3 30 V DC		(1 digit res.) or 100 000 kW
Current	$\leq$ 20 mA with a residual voltage of $\leq$ 0.5 V		(0 digit res).  For flow it is the max. selectable value x 10 000 the last digit of display (e. g. 20 mA = 1 000.0 m <sup>3</sup> /h (1 digit res.) or 10 000 m <sup>3</sup> /h
			(0 digit res.).

#### CITE AND FUEDED amount coloulate

		SITR	NS FUE950 energy calculator	
Load	Max. 800 Ω	Power consumption		
Upper limit	Up to 20.5 mA (exceed causes	230 V and 24 V versions	Typical current appr. 0.15 VA	
Signal on alarm	the error current value) Errors are indicated with 3.5 mA or 22.6 mA (programmable, default: 3.5 mA)	3.6 V D-cell battery	Typical battery lifetime 10 years under normal conditions (no addon modules, max. 40 °C ambient temperature)	
Output values	Power, flow, temperature (configuring via software tool; default: for #1: Power and for #2: Flow)	Supply data	Internal voltage 3.6 V by the battery or plug-in power supply module	
M-Bus output		Battery, 3.6 V type (option)	3.6 V lithium D-cell, battery lifetime	
Туре	The optional M-Bus plug-in mod- ule is a serial interface for com- munication with external devices (M-Bus Repeater)		typically 16 years with indepen- dently powered flowmeter	
		230 V AC module (option)	Plug-in module for 230 V AC (195 253 V AC), 50/60 Hz (incl. battery backup)	
Protocol	M-Bus according EN 1434-3	24 V AC module (option)	Plug-in module for 24 V AC	
Connection	The connection is not polarity-conscious and is electrically isolated, connection of 2 x max. 2.5 mm² wires, 300 or 2400 baud (auto baud detection), current drawn: one M-Bus load.  M-Bus address: Each port has its own primary M-Bus address (Prim1 = the last two digits of the serial number; Prim2 = 0). The secondary address is unique for each calculator and is factory-set to equal the serial number.	2.17.10000.0 (0p.1101.)	(12 30 V AC) (incl. battery backup)	
		Battery backup (option)	Only with mains supply modules by internal 3.0 V lithium battery (type CR 2032) Displayed values, date and time are still updated, but the measur-	
			ing functions have stopped, including the flow rate measurement. Communication via optional modules M-Bus, RS 485, RS 232 or optical interface is maintained, affecting the backup battery lifetime.	
RS 232 output		Accessories/Software	une.	
Туре	The optional module RS 232 is a serial interface for data transmis-			
	senal interface for data transmission with external devices, e.g. PC; baud rate: 300 or 2400. The module contains a 3-pole terminal	The parameterization software based on the M-Bus is a convenient tool for handling the calculator. It runs on Windows and is used for:		
	strip with terminals marked 62 (TX), 63 (RX) and 64 (GND). For this purpose a special data cable	Configuration of the calculator functionality, reading out different memories, printing out calculator logs (standard).      Type of the device (advanced actual).		
	is necessary.	Expert programming of the device (advanced setup).		
Protocol	M-Bus according EN 1434-3			

Configuration of the calculator functionality, reading out different memories, printing out calculator logs. For further details please contact your local Siemens representative.

A specific optical head with a permanent magnet in (IrDA adapter with bluetooth) accordance with EN 1434 can be used for programming/altering programming of readout data, configuration data, etc. The reader head can also be used to change measuring data.

#### RS 485 output

Connection

Function

The optional RS 485 module is a serial interface for data transmission with external devices, e.g. PC; baud rate: 2400. The module contains a 4-pole terminal strip with terminals marked D+, D-, Vcc and GND

The module contains a 3-pole ter-

minal strip with terminals marked

62, 63, 64 (max. 2.5 mm<sup>2</sup>); Connected cable length: max 10 m;

For communication with a PC a

(Article No. A5E02611774).

special adapter cable is required

Protocol

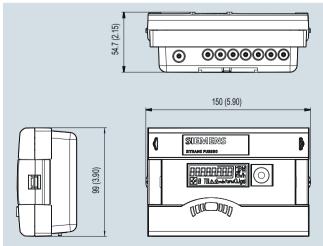
M-Bus protocol according EN 1434-3

Connection

Terminals D+ and D-; electrically isolated; 2400 baud only.

An external supply of 12 V DC ± 5 V (<5 W) is needed for the module (terminals Vcc and GND). The module terminals are max. for 2.5 mm<sup>2</sup> wires. Connected cable length: max. 10 m

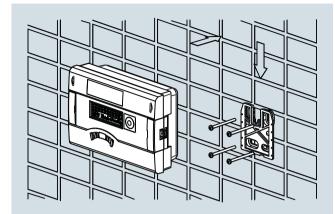
#### Dimensional drawings



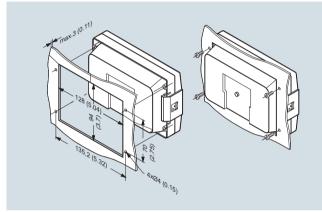
SITRANS FUE950, dimensions in mm (inch)

SITRANS F US Inline

#### SITRANS FUE950 energy calculator



Wall mounting



Panel mounting, dimensions in mm (inch)

#### Pt500 temperature sensor pairs

#### Application

The temperature sensor set is designed for use with the Siemens energy calculator type SITRANS FUE950 for measurement of the energy consumption in a district heating or cooling net.

Temperature sensors are one of the integral components of every thermal energy meter in heating or cooling applications. They are used for determining temperature changes in fluids due to energy taken from or supplied to the loop. The temperature is thus measured by mounting temperature sensors upstream and downstream from the point where the exchange in the thermal energy of the system is.

To ensure an accurate measurement of the temperature difference according to MID (EN 1434) or PTB K7.2 the sensors are delivered as matched pairs.

By selection with the corresponding Order code the Pt500 sensor pair sets can be delivered with heating approval or with approvals for combined heating/cooling applications.

#### Technical specifications

#### Temperature sensor pairs:

#### 2-wire Pt500

#### Pt500 2-wire temperature sensor pair (EN 1434)

Measuring insert Pt500 temperature sensor, EN 60751, tolerance class B,

2-wire

Pairing Paired to EN 1434

(10 ... 130 °C/14 ... 266 °F) Media temperature 0...150 °C (32 ... 302 °F)

Response time T<sub>0.5</sub> See sensor pocket specifications

Medium Typically heating water

Pressure rating See sensor pocket specifications

Protection IP65

Pipe material AISI 304Ti/1.4303

Dimension Ø 6 mm
Sensor tube length 50 mm

Cable length Up to 10 m (32.8 ft), fixed connected silicon cable, 2 connec-

tion wire terminals, terminal sleeves to DIN 46228

#### 4-wire Pt500

Type approval

## Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)

Measuring insert Pt500 temperature sensor, EN 60751, tolerance class to

Pairing Matched paired according to

EN 1434 at 10, 75 and 140 °C (50, 167 and 284 °F)

ISO 751 Class B; 4-wire

(50, 167 and 284 °F)

MID (DE-06-MI004-PTB011) and PTB K7.2 (PTB 22.77/09.01). Only to be mounted with related sensor pockets according to the

type approvals.

Media temperature 0...150 °C (32 ... 302 °F)

Permissible temp. pair range for  $\Delta T$ 

Heating 3 ... 150 K Cooling 3 ... 85 K

Medium Approved for heating/cooling

water

Protection IP65

Environment

• Mechanic class M3

• Electromagnetic class E1 (MID)

Pressure rating See sensor pocket specifications

Material

• Protective tube Stainless steel AISI 304Ti/1.4571

(or similar), diameter of protec-

tive tube: 6 mm

Connector cable
 Silicon cable, 4 connection wire

terminals, terminal sleeves to DIN 46228

Sensor tube length 140 or 230 mm

(5.51 or 9.06 inch)

Cable length 5 m (16.4 ft), fixed connected

# Flow Measurement SITRANS F US Inline

# SITRANS FUE950 energy calculator

#### Sensor pockets

#### Stainless steel sensor pocket (for 4-wire Pt500 types only - standard)

Media temperature 0 ... 150 °C (32 ... 302 °F)

Approval Approved only together with 4-wire sensors

Medium Approved for heating/cooling water; up to max.

5 m/s flow velocity

Pressure rating PN 40

Length Face-to-face length 120/135 and 210/225 mm

(4.72"/5.23" and 8.27"/8.86")

External diameter Protective tube 8/11 mm (0.32"/0.43")

Internal diameter Protective tube 6 mm (0.24")

Pipe connection Thread G 1/2" (with sealing screw for sensor)

Material Protective tube AISI 316Ti/1.4571 (or similar)

Use 
• Use with related 4-wire Pt500 sensors only (according type approval)

(according type approval)For flow velocities up to 5 m/s

 Recommended to install with welded sleeve (according to EU standard)

# Stainless steel sensor pocket (for 2-wire Pt500 types only - some only available as spare part)

Media temperature 0 ... 180 °C (32 ... 356 °F)

Medium Approved for heating water

Response time  $T_{0.5}$  Typically 13 s at 0.4 m/s without pasta

Typically 5 s at 0.4 m/s with pasta

Pressure rating PN 25

Length L1 (

L1 (mm) 92 127 168 223 L (mm) 82 117 155 210

Material Stainless steel: AISI 316Ti/1.4571
Use For 2-wire Pt500 types only

# Brass sensor pocket (for 2-wire Pt500 types only - some only available as spare part)

Response time  $T_{0.5}$  Typically 9 s at 0.4 m/s without pasta

Typically 5 s at 0.4 m/s with pasta

Pressure rating PN 16

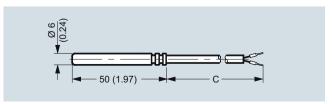
Length L1 (mm) 47 92 127 L (mm) 40 82 117

Material Brass: CuZn<sub>40</sub>Pb<sub>2</sub> (Ms58)
Use For 2-wire Pt500 types only

#### Dimensional drawings

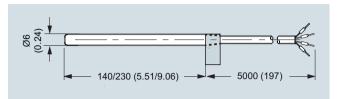
# Pt500 2-wire temperature sensor pair (EN 1434)

Cable length 2, 3, 5 or 10 m ('C' at the dimensional drawing)



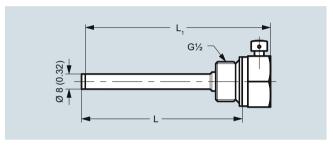
Pt500 2-wire temperature sensor, dimensions in mm (inch)

#### Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)



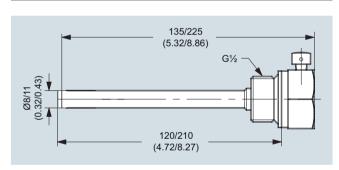
Pt500 4-wire temperature sensor, dimensions in mm (inch)

# Stainless steel sensor pocket (for 2-wire Pt500 types only) Length L1 (mm) 92 127 168 223 L (mm) 82 117 155 210



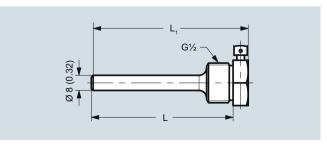
Sensor pocket (for 2-wire Pt500 types only), stainless steel, dimensions in mm (inch)

#### Stainless steel sensor pocket (for 4-wire Pt500 types only)



Stainless steel sensor pocket, dimensions in mm (inch)

Brass sensor pocket (for 2-wire Pt500 types only)								
Length	L1 (mm)	47	92	127				
	L (mm)	40	82	117				



Sensor pocket, brass (for 2-wire Pt500 types only), dimensions in mm (inch)

SITRANS F US Inline

# SITRANS FUE950 energy calculator

Selection and Or	dering data		Article No.	Order code
Energy calculato	r SITRANS FUE	950, MID or PTB K7.2 custody transfer approved	7 ME 3 4 8 0 -	
	ticle No. for the			
Flow input settin The pulse input va To get optimal fun to the maximum fl. The following calc 5 ms: L/pulse > Q For example Q <sub>max</sub> 1 l/pulse.	alue selection miction and perfor ow rate. Eulation formula (may (m³/h)/360.			
Pulse input in I/pulse or in gal/pulse (with option L05)	Flow limit Q <sub>max</sub> in m <sup>3</sup> /h	Flow limit Q <sub>max</sub> in GPM *) (with option L05)		Ш
1 2.5	360 900	6 000 15 000	2 A 2 B	
2.5 5	1 800	30 000	2 C	
10	3 600	60 000	3 A	
25	9 000	150 000	3 B	
50	18 000	300 000	3 C	
100	36 000	600 000	4 A	
250	90 000	-	4 B	
500	180 000	-	4 C	
1 000	360 000	-	5 A	
*) GPM = Gallons	per minute	I		
Calculator applic	ation/Flowmete	er installation place		
For heating, flown	neter in return pi	pe (cold pipe), typical standard	A	
For heating, flown	neter in forward	pipe (hot pipe)	В	
For cooling, media	a water, flowmet	C		
For cooling, media	a water, flowmet	D		
For combined cod	oling/heating, flo	E		
(MID conformity d				
For combined coc (MID conformity d		F		
Temperature sen		_		
Pt500 setup, no se	• •	led (standard)		
Pt500 setup and F and 140 mm sens test report (mentic sensor pockets).	Pt500 sensor pai or length. MID a	3		
and 230 mm sens	or length. MID a	r (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter pproved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory are only valid if temp. sensors are used with the applicable temperature	4	
Pt100 setup, no se	•		5	
50 mm length, wit	h MID approval	air (6/50 mm), 2-wire type incl. 5 m cable, 6 mm sensor diameter and (only for use with the applicable temperature sensor pockets)	6	
		air (6/50 mm), 2-wire type incl. 10 m cable, 6 mm sensor diameter and (only for use with the applicable temperature sensor pockets)	_	
Temperature sen	sor pocket sets	: (for 6 mm sensor diameter)		
No pockets (stand	dard)			0
		nsors, length 82/92 mm, G½ inch, max. PN 16 (2 pcs.)		2
Stainless steel pool (2 pcs. for 140 mr			5	
Stainless steel po	ckets for 6 mm 2		6	
Stainless steel pool (2 pcs. for 230 mr		m length for 6 mm sensor diameter, max. PN 40 and max 5 m/s above)		7
Stainless steel poo	ckets for 6 mm 2	2-wire sensors, length 155/168 mm, G½ inch, max. PN 25 (2 pcs.)		8
Voltage supply				
Battery 3.6 V DC (	Litium D-cell typ	ne) (standard)		1
Mains power mod	ule for 230 V AC	supply (incl. back-up battery)		2
Mains power mod	ule for 24 V AC	supply (incl. back-up battery)		3
No power supply	module (power s	supply ordering separate)		4

# Flow Measurement SITRANS F US Inline

# SITRANS FUE950 energy calculator

Selection and Ordering data	Article No. Order	r code
Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved	7 ME 3 4 8 0	
Option modules		
No module (standard)	A	
1 module (communication module)		
M-Bus module RS 232 module (M-Bus protocol)	B C	
RS 485 module (M-Bus protocol)	D	
1 module (function module)		
Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	E	
Pulse input, 2x input (In1 and In2) Pulse out-/input combination, 2x input and 1x output	F G	
Combination of 2 modules (communication and function module)	ď	
M-Bus module and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	н	
M-Bus module and Pulse input, 2x output (Out1 Energy and Out2 Volume)  M-Bus module and Pulse input, 2x input (In1 and In2)	"j	
M-Bus module and Pulse out/-input combination, 2x input and 1x output	K	
RS 232 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	L	
RS 232 module (M-Bus) and Pulse input, 2x input (In1 and In2)	M	
RS 232 module (M-Bus) and Pulse out/-input combination, 2x input and 1x output	N P	
RS 485 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume") RS 485 module (M-Bus) and Pulse input, 2x input (In1 and In2)	Q	
RS 485 module (M-Bus) and Pulse out/-input combination, 2x input and 1x output	R	
Combination current output module, 2x passive 4 20 mA (Out 1 "Power", Out 2 "Flow")	S	
(occupies both module Ports 1 and 2)		
Display units and resolutions		
MWh & kW, m <sup>3</sup> , m <sup>3</sup> /h in 2 digit resolution; Temperature: no decimal figures MWh & kW, m <sup>3</sup> , m <sup>3</sup> /h in 1 digit resolution; Temperature: no decimal figures	C D	
MWh & kW, m <sup>3</sup> , m <sup>3</sup> /h in 0 digit resolution; Temperature: no decimal figures	E	
GJ & kW, m <sup>3</sup> , m <sup>3</sup> /h in 2digit resolution; Temperature: no decimal figures	н	
GJ & kW, m <sup>3</sup> , m <sup>3</sup> /h in 1 digit resolution; Temperature: no decimal figures	J	
GJ & kW, m <sup>3</sup> , m <sup>3</sup> /h in 0 digit resolution; Temperature: no decimal figures	К	
Gcal & kW, m <sup>3</sup> , m <sup>3</sup> /h in 2 digit resolution; Temperature: no decimal figures	M	
Gcal & kW, m <sup>3</sup> , m <sup>3</sup> /h in 1 digit resolution; Temperature: no decimal figures Gcal & kW, m <sup>3</sup> , m <sup>3</sup> /h - in 0 digit resolution; Temperature: no decimal figures	N P	
MBTU & MBTU/h, m³, m³/h in 2 digit resolution; Temperature: no decimal figures	Q	
MBTU & MBTU/h, m³, m³/h in 1 digit resolution; Temperature: no decimal figures	R	
MBTU & MBTU/h, m <sup>3</sup> , m <sup>3</sup> /h - in 0 digit resolution; Temperature: no decimal figures	S	
Verification/Approval		
Without type approval mark, neutral label (standard))	0	
With MID type approval mark (only for heating combinations, selection "A, B, E and F") With MID approval mark and first MID verfication (only for heating, selection A, B, E and F")	1 2	
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 (only for cooling and	7	
media water, selection "C and D")		
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 and first verification (only for cooling and media water, selection "C and D")	8	
Further designs		
Please add "-Z" to Article No. and specify Order code		
Certificate		
Including factory test report (certificate) of FUE950	ALWAYS INCLUDED	
Cooling, setup for non water		
Water/glycol setting for media type "Tyfocor LS (R)" (only with neutral label, no verification and approval)		C 0 2
Optional settings/programming		
Tariff function settings (specify in clear text, up to max. 20 characters)		D 0 2
Pulse output setting of option module (specify in clear text, up to max. 20 characters)  Pulse input setting of option module (specify in clear text, up to max. 20 characters)		D 0 6 D 0 8
Pulse input setting of 4 20 mA option module (please specify 20 mA related type and value in clear text,		D 1 0
up to max. 20 characters)		
Special display units		
Flow in 'GPM' and Volume in 'gal' (x100) (digits/resolution as selected above, only with 0 digit resolution)		L 0 5
Temperature in deg. F (digit resolution as selected above)		L 3 1

SITRANS F US Inline

# SITRANS FUE950 energy calculator

# Flowmeter SITRANS FUE950 operating instructions, accessories and spare parts

## Operating instructions

Description	Article No.
• English	A5E03424739

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Accessories

Description	Article No.
Infrared optical head (Bluetooth type) for data acquisition & programming of FUE950	A5E02611768
Bracket for SITRANS FUE950 wall mounting (20 pcs.)	A5E02611769
Cable for data acquisition via RS 232 PC/D-sub 9F/3 wire	A5E02611774
Basic version of programming software tool for FUE950	free download from internet
Expert version of programming software tool for FUE950	A5E03478951
Test Lab. version of re-programming software tool for FUE950 (Note: Before using this Test-Lab version an online training must be completed)	A5E03461778

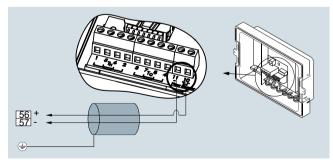
#### Spare parts

oparo parte	
Description	Article No.
Add-on modules for FUE950 (only for 7ME348 versions)	
Pulse input module (2 inputs)	A5E03461432
Pulse output module (2 outputs)	A5E03461436
Combined pulse in-/output module (2 inputs and 1 output)	A5E03461437
RS 232 module (M-Bus protocol)	A5E03461459
RS 485 module (M-Bus protocol)	A5E03461512
M-Bus module	A5E03461516
Combined current output module, 2 x passive 4 20 mA	A5E03461583
Connection cable for option modules (types: Pulse, RS 232/RS 485, M-Bus, mA) (special connection cable with 2 plugs)	A5E03461585
Power supply for FUE950 (only for 7ME348 versions)	
3.6 V D-cell battery for SITRANS FUE950	A5E03461708
$230~\rm V~AC$ supply module (incl. internal fuse T50 mA L $250~\rm V~and~back\text{-}up~battery)$ for SITRANS FUE950	A5E03461717
24 V AC supply module for SITRANS FUE950, incl. back-up battery	A5E03461719
Pocket for temperature sensors Pt500 (for related 4-wire Pt500 type only, 1 pc.)	
Stainless steel pocket (1 pc.), 135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 140 mm sensor length).	A5E03462868
Stainless steel pocket (1 pc.), 225 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 230 mm sensor length).	A5E03462870

Description	Article No.		
Pt500 4-wire temperature sensor pair, with MID MI004 and PTB K7.2 approvals and verification (for related 4-wire sensor pocket types only)			
Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462872		
PT500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462878		
FUE950 enclosure (only for 7ME348 versions)			
Bottom part of FUE950 enclosure (1 pc.)	A5E03461508		
Snap fit for FUE950 enclosure (1 pc.)	A5E30461731		
Pocket for Pt500 temperature sensors (for corresponding 2-wire Pt500 types only, 1pc.)			
Brass pocket 6 mm, G½B x 40 mm (PN 16), 1 pc.	A5E02611778		
Brass pocket 6 mm, G½B x 85 mm (PN 16), 1 pc.	A5E02611779		
Brass pocket 6 mm, G1/2B x 120 mm (PN 16), 1 pc.	A5E02611780		
Stainless steel 6 mm, G½B x 85 mm (PN 25), 1 pc.	A5E02611781		
Stainless steel 6 mm, G½B x 120 mm (PN 25), 1 pc.	A5E02611783		
Stainless steel 6 mm, G½B x 155 mm (PN 25), 1 pc.	A5E02611792		
Stainless steel 6 mm, G½B x 210 mm (PN 25), 1 pc.	A5E02611793		
Pt500 temperature sensor pair, 2-wire cable, 6 mm sensor diameter, with MID/EN-approval (for corresponding 2-wire sensor pocket types only)			
Cable length:			
2 m	A5E02611794		
3 m	A5E02611795		
5 m	A5E02611796		
10 m	A5E02611798		

## Schematics

# Electrical connection for SITRANS FUS380/FUE380/FUE950 and MAG 5000/6000/FUE950



The diagram shows the connection between SITRANS FUE950 (terminals 10 and 11) and FUS380/FUE380 and MAG 5000/6000 (terminals 56 and 57). Temperature sensors must be connected to terminals 5 (1) and 6 (2) ( $T_{\rm H}$ ) and 7 (3) and 8 (4) ( $T_{\rm C}$ ).

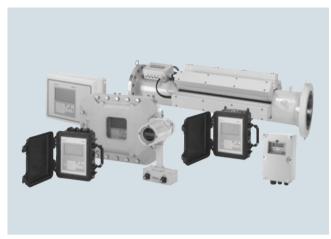
#### Note

The right flowmeter pulse output value must be equal to the FUE950 pulse input value and must be checked via the user menu of the transmitter MAG 5000/6000 or nameplate of FUE380 or FUS380.

# SITRANS F US Clamp-on

#### **Clamp-on ultrasonic flowmeters**

#### Overview



SITRANS F US clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense.

#### Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- · No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single, dual or multiple channel versions and a variety of enclosures - to suit your operating conditions and requirements

## Application

SITRANS F US clamp-on ultrasonic flowmeters have seven product families, each targeting specific applications:

**SITRANS FUS1010 Standard and SITRANS FUP1010 Portable flowmeters** are suitable for a wide variety of liquid applications, including the following:

- · Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
- Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot & cold water systems
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- · Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

**SITRANS FUE1010 Energy flowmeters** are ideally suited to thermal energy/power industry applications, including:

- Chilled water sub-metering
- · Hot water sub-metering
- Condenser water
- Glycol
- Thermal storage
- Lake source cooling

**SITRANS FUH1010 Oil flowmeters** are ideal for applications carrying crude oil, refined petroleum or liquefied gas. There are three application areas: Interface detection, precision volume and standard volume.

#### Interface detection

- Precise identification of interfaces on multi-liquid pipelines
- · Product identification
- Density indication

#### Precision volume

- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity changes

#### Standard volume

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- · Mass flow output measurement
- Interface detection
- Scraper ("pig") detection
- Chemical and petrochemical processing

**SITRANS FUG1010 Gas flowmeters** are ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- · Lost and unaccounted for (LAUF) analysis
- Production
- Storage

**SITRANS FST020 Basic flowmeters** are suitable for most clean liquid applications, including the following:

- Water & wastewater industry
  - Potable water
  - Wastewater, influent & effluent
- Processed sewage, sludge
- · Chemical feed industry
- Sodium hypochlorite
- Sodium hydroxide
- HVAC & power industries
  - Coolant flow
  - Fuel flow
- Process control
  - Chemicals
  - Pharmaceuticals

SITRANS F US Clamp-on

# Clamp-on ultrasonic flowmeters

# **SITRANS FUT1010 Liquid and gas flowmeters** are suitable for liquid and gas applications, including the following:

- Liquid
   Pipeline balancing
   - Terminal transmix metering
   - Refinery blending
   - Airport facility management
   - Petrochemical processing
   - Plant optimization
- Gas
  - Production wells
  - Underground storageTransmission

  - Electric power generationGas processing plants

# Flow Measurement SITRANS F US Clamp-on

System information SITRANS F US Clamp-on ultrasonic flowmeters

## System information and selection guide

SITRANS F US Clamp-on flowmeters	FUS1010 (Standard)	FST020 (Basic)	FUP1010 (Portable)	FUE1010 (Energy)	FUH1010 (Oil)	FUG1010 (Gas)	FUT1010 (Liquid/Gas)
Industry/Applications							
Water and aqueous solutions	Х	Х	Х	Х			
Utility district heating, cooling	Х	Х	Х	Х			
Chemical	Х	Х	Х				
Hydrocarbons/Petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume					Х		Х
Hydrocarbons (Single product with limited viscosity range) gross volume	X		Х		Х		Х
Very low flow (< 0.1 m/s) in small pipes	Х	Х	Х				
Natural gas						Х	Х
Process gas						Х	Х
Slurries or liquids with high percentage of undissolved gases	X <sup>4)</sup>		х	х			
High temperature liquids > 120 °C (248 °F)	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>		
Aerospace or hydraulic test	X <sup>2)</sup>		X <sup>2)</sup>				
Refrigeration liquids	Х	Х	Х	Х			
Food products	Х	Х	Х				
Design							
Field clamp-on (non-intrusive)	Х	Х	Х	Х	Х	Х	Х
Doppler (Reflexor) hybrid capability	X <sup>4)</sup>		Х	Х			
Standard volume or mass flow; per API 2540					х		х
Interface detection					х		Х
Density output					х		Х
Standard volume or mass flow; per AGA 8						Х	Х
Differential temperature with energy calculation				Х			
Temperature measurement	Х		Х	Х	Х	Х	Х
Analog input	Х		Х	Х	Х	Х	Х
Large graphics display	X <sup>4)</sup>		Х	Х	X <sup>4)</sup>	X <sup>4)</sup>	Х
Diagnostic PC software (Si-Ware)	Х	Х	Х	х	х	Х	Х
Number of acoustic paths and channel	ls						
1-channel	Х	Х	Х	Х	Х	Х	Х
2-path	Х		Х	х	Х	Х	Х
2-channel w/arithmetic function	Х		Х	Х			
4-path/(special order)	Х				х	Х	Х
4-channel w/sum of active channels	Х						
Transmitter enclosure							
IP65 (NEMA 4X) wall mount	Х	Х		Х	Х	Х	Х
IP67 weatherproof			Х				
IP40 (NEMA 1) portable				X <sup>3)</sup>			
IP65 (NEMA 7) compact explosionproof	Х				Х	Х	
The state of the s	Х				X	Х	Х

<sup>1)</sup> Special order high temperature clamp-on sensor

<sup>2)</sup> Special order Aerospace clip-on sensor recommended

<sup>3)</sup> Available with portable energy systems

<sup>4)</sup> Not for NEMA 7 compact explosionproof

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

SITRANS F US Clamp-on flowmeters	FUS1010 (Standard)	FST020 (Basic)	FUP1010 (Portable)	FUE1010 (Energy)	FUH1010 (Oil)	FUG1010 (Gas)	FUT1010 (Liquid/Gas)
Power Supply							
Internal battery operation			Х	X <sup>1)</sup>			
Battery charger (100 240 V AC 50 60 Hz) with country specific line cord			Х	X <sup>1)</sup>			
90 240 V AC, 50 60 Hz	Х	Х		Х	Х	Х	Х
9 36 V DC <sup>4)</sup>	Х	Х		Х	Х	х	Х
Size (For larger pipes, see spares list	for appropriat	e sensors and	d mountings.)				
6.5 9150 mm (0.25" 360.24")	Х	Х	Х				
38 9150 mm (1.5" 360.24")				Х	Х	Х	
Approvals							
FM/CSA <sup>2)5)</sup>	Х			X <sup>3)</sup>	Х	Х	Х
ATEX <sup>5)</sup>	Х				Х	Х	х
UL/ULc <sup>5)</sup>		Х	Х	X			
C-TICK <sup>5)</sup>	Х	Х		Х	Х	Х	

<sup>1)</sup> Available with portable energy systems

# Sensor type selection guide

	Standard	sensor suppo	rted in MLFB	
Application condition. Note all that apply before making selection	High precision	Universal	(Reflexor)	Notes
Media				
General survey (clean liquids) on non-steel pipes		Х	0	
General survey (clean liquids) on a limited range of steel pipes	Х		0	
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	Х			
Highly aerated liquid or slurry	0	0	Х	
Permanent installation on steel pipe (clean liquids)	Х		0	
Installation in offshore or corrosive environment	0	X <sup>1)</sup>	0	Sensors available with corrosion resistance as special order
Liquid temperature greater than 120 °C (248 °F)	0	X <sup>1)</sup>		High temp metal block sensors available as special order (to 230 °C (446 °F))
Operation on single pipeline flowing multiple products	Х	0		
Natural gas or process gas	Х	0	0	Consult sales specialist for all gas applications
Pipe material				
Steel	Х		0	
Steel pipe with diameter/wall thickness ratio <10	0	Х		
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	0	Х		High precision sensors can also be used on plastic and aluminum pipes
Wall thickness > 31.75 (1.25")	0	Х		

O = not suitable X = preferred choice

<sup>2)</sup> NEMA 4X associated equipment in DIV 2 connected to DIV 1 sensors, NEMA 7 explosion proof equipment in DIV 1 connected to DIV 1 sensors.

<sup>3)</sup> Not for portable enclosure

 $<sup>^{\</sup>rm 4)}$  -Neg and +pos ground available for compact NEMA 7

<sup>&</sup>lt;sup>5)</sup> Products are marked with CE as required by european directive.

<sup>1)</sup> Available for special order

# Flow Measurement SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

## Definitions

Sensor Chart	Description
Standard	Standard system sensor, plastic body with alu housing, FM, CE
Spare	Available for special application and special pipes. Contact factory for application use.
	Not available as part of a configured product
Gas	Usable for gas application. Available also as corrosion resistant, frame, track or weldseal mounting, T1, T2. FM, ATEX, CE
CE	All flowmeter and sensors are CE - certified
Ex-FM	Standard, corrosion resistant, frames, weldseal, T1, T2, T3
Ex-ATEX	Option for all corrosion resistant, frames, weldseal, T1, T2, T3
Corrosion resistant	SS Housing instead Alu
Trackless	Fixed only by straps, no other mounting (spacer bar as an option)
Tracks	Portable and dedicated for universal size A/B and for HP size A/B. For all size HT only dedicated
Frames	Portable and dedicated for universal size C,D,E, and for HP size C/D. For universal and HP size B available for pipes >125 OD
Portable	BNC instead F-connector. Mounting universal sensor by portable tracks, frames and spacerbar
Transportable	Dedicated sensor including adapter for portable BNC cables.
WeldSeal	Special SS Frames for FUH1010,FUG1010, but also special FUS1010. Corrosion resistant, Liquid and Gas, T1, T2
T1	Usable -40 to 120°C, but best for Ø Temperature <40°C; Standard
T2	Usable -40 to 120°C, but best for Ø Temperature >40°C - <80°C; Named as high temperature high precision
T3	Usable -40 to 120°C, but best for Ø Temperature >80°C; special request
Submersible	Transducers can be used submersible by denso.

Sensor availability guide

Availability																	
Sensor models	Standard	Spare only	Gas	Ex-ATEX	Ex-FM	Corrosion restistant	Trackless	Tracks	Frames	Portable	Transportable	WeldSeal	T1 (best use -40 65 °C)	T2 (best use1 104 °C)	T3 (best use 32 120 °C)	Submersible	Cataloge
Universal Sensor -40 120 °C Alu housing CE IP68																	
A1 Universal for pipe OD – 5.8 50.8 mm (0.23" 2")		Х					X <sup>3)</sup>			X						X <sup>1)</sup>	
A2 Universal for pipe OD – 12.7 50.8 mm (0.5" 2")	X						X <sup>3)</sup>			X						X <sup>1) 2)</sup>	Х
B1 Universal for pipe OD – 12.7 76 mm (0.5" 3")		Х					X <sup>3)</sup>			X						X <sup>1)</sup>	
B2 Universal for pipe OD – 12.7 76 mm (0.5" 3")		Χ					X <sup>3)</sup>			X						X <sup>1)</sup>	
B3 Universal for pipe OD – 19 127 mm (0.75" 5")	X						X <sup>3)</sup>	Х	Х	X						X <sup>1) 2)</sup>	Х
C1 Universal for pipe OD – 51 254 mm (2" 10")		X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	Х		X	X						X <sup>1)</sup>	
C2 Universal for pipe OD – 51 254 mm (2" 10")		X				X <sup>1)</sup>			X	X						X <sup>1)</sup>	
C3 Universal for pipe OD – 51 305 mm (2" 12")	X			X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	Х		X	X						X <sup>1) 2)</sup>	Х
D1 Universal for pipe OD – 102 508 mm (4" 20")		X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X		X	X						X <sup>1)</sup>	
D2 Universal for pipe OD – 152 610 mm (6" 24")		X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	Х		X	Χ						X <sup>1)</sup>	
D3 Universal for pipe OD – 203 610 mm (8" 24")	Х			X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X		Х	X						X <sup>1) 2)</sup>	X
*E1 Universal for pipe OD – 254 3048 mm (10" 120")		X				X <sup>1)</sup>			X	X						X <sup>1)</sup>	
*E2 Universal for pipe OD – 254 6096 mm (10" 240")	X			X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X		X	X						X <sup>1) 2)</sup>	X
*E3 Universal for pipe OD – 304 9144 mm (12" 360")		X	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X		X	X		X <sup>1)</sup>				X <sup>1)</sup>	

<sup>1)</sup> Excluding portable

<sup>2)</sup> Spare only

<sup>3)</sup> Usable but not recommended

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

									Ava	ilabi	lity						
Sensor models	Standard	Spare only	Gas	Ex-ATEX	Ex-FM	Corrosion restistant	Trackless	Tracks	Frames	Portable	Transportable	WeldSeal	T1 (best use -40 65 °C)	T2 (best use1 104 °C)	T3 (best use 32 120 °C)	Submersible	Cataloge
High Precision Sensor -40 +120 °C Alu T1 (T2, T3) CE	IP68																
A1H (High Precision) for pipe WT - 0.64 1.0 mm (0.025" 0.04")		X	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	X			X		X	X	Х	X <sup>1)</sup>	X
A2H (High Precision) for pipe WT - 1.0 1.5 mm (0.04" 0.06")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	X			X		X	X	х	X <sup>1) 2)</sup>	X
A3H (High Precision) for pipe WT - 1.5 2.0 mm (0.06" 0.08")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	X			Х		х	х	х	X <sup>1) 2)</sup>	X
B1H (High Precision) for pipe WT - 2.0 3.0 mm (0.08" 0.12")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	х	х		х		х	х	х	X <sup>1) 2)</sup>	х
B2H (High Precision) for pipe WT - 3.0 4.1 mm (0.12" 0.16")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	х	х		х		х	х	х	X <sup>1) 2)</sup>	X
B3H (High Precision) for pipe WT - 2.7 3.3 mm (0.106" 0.128")		x	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>3)</sup>	х	х		Х		х	х	х	X <sup>1)</sup>	х
C1H (High Precision) for pipe WT (stainless steel construction) - 4.1 $\dots$ 5.8 mm (0.16" $\dots$ 0.23")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1) 2)</sup>	Х
C2H (High Precision) for pipe WT (stainless steel construction) - 5.8 8.1 mm (023" 0.32")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1) 2)</sup>	х
* D1H (High Precision) for pipe WT (stainless steel construction) - 8.1 11.2 mm (032" 0.44")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1) 2)</sup>	х
* D2H (High Precision) for pipe WT (stainless steel construction) - 11.2 15.7 mm (0.44" 0.62")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1) 2)</sup>	х
* D3H (High Precision) for pipe WT (stainless steel construction) - 7.4 9.0 mm (0293" 0.354")		X	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1)</sup>	X
* D4H (High Precision) for pipe WT (stainless steel construction) - 15.7 31.8 mm (062" 1.25")	X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	х		х		Х	X <sup>1)</sup>	х	х	х	X <sup>1) 2)</sup>	х
High Temperature Universal Sensor -40 +230 °C																	
High Temperature size 1 230 deg C (diam. 12.7 100 mm)		Χ		X <sup>1)</sup>	X <sup>1)</sup>			Χ			Х						
High Temperature size 2 230 deg C (diam. 30 200 mm )	Х			X <sup>1)</sup>	X <sup>1)</sup>			X			Х						Х
High Temperaturer size 3 230 deg C (diam. 150 610 mm)	Х			X <sup>1)</sup>	X <sup>1)</sup>			Х			Х						Х
High Temperature size 4 230 deg C (diam. 400 1200 mm)	X				X <sup>1)</sup>			Х			Х						Х
High Temperaturer size 2A 230 deg C (diam. 30 200 mm)		X			X <sup>1)</sup>			X			Х						
High Temp. size 3A 230 deg C (diam. 150 610 mm)		X			X <sup>1)</sup>			X			X						
High Temp. size 4A 230 deg C (diam. 400 1200 mm)		Х		X <sup>1)</sup>	X <sup>1)</sup>			Х			Х						
Doppler Sensor																	
Doppler Sensor, for up to 121 °C (250 °F)	X				X <sup>1)</sup>		Х			Х						X <sup>1)</sup>	Х
Corrosion Resistant Doppler, for up to 121 °C (250 °F)		X		X <sup>1)</sup>	X <sup>1)</sup>	X <sup>1)</sup>	X										

<sup>1)</sup> Excluding portable 2) Spare Only

<sup>3)</sup> Useable but not recommended

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

# Sensor mounting availability guide

				Ser	nsor			
	Universal NEMA	Universal portable	WeldSeal sensors	Dedicated gas and liquid flow HP sensors	Portable liquid flow HP sensors	High temperature universal sensors	Doppler NEMA	Doppler portable
Mounting								
Trackless	Х	Х		Х	Х		Х	Χ
Tracks universal dedicated	Х	X <sup>1)</sup>						
Tracks universal portable	X <sup>1)</sup>	Х						
Tracks HP dedicated				X	X <sup>1)</sup>			
Tracks HP portable				X <sup>1)</sup>	X			
Frames universal dedicated	Х	X <sup>1)</sup>						
Frames universal portable	X <sup>1)</sup>	Х						
Frames HP dedicated				X	X <sup>1)</sup>			
Frames HP portable				X <sup>1)</sup>	Х			
Tracks high temp universal						Х		
WeldSeal single enclosure			Х					
WeldSeal dual enclosure			Х					
SpacerBar	Х	Х		Х	Х			
Straps	Х	X <sup>1)</sup>		Х	X <sup>1)</sup>	Х	Х	X <sup>1)</sup>
Chains tension hook		Х			Х			
Chains EZ-Clamp 1	Size C, D	Size C, D		Size C	Size C			
Chains EZ-Clamp 2	Size E	Size E		Size D	Size D			
Denso	Х			Х			Х	
Doppler-Chains								X

<sup>1)</sup> Useable but not recommended

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

# Input/output and function availability guide

			<b>J</b>	-		Outp	ut						Inpu	ıt							
			Standard	Additional inputs	Expanded/Enhanced	4 20 mA active	4 20 mA passive	0 10 V	0 5 kHz	p-gen (20 40 kHz)	Relais - Dry reed	Status allarm	4 20 mA passive	0 10 V	100 Ohm RTD	NoTot	CirTot	АТЕХ	Unimass	Modbus	Doppler
FUS1010		Single channel	X			2		2	2		4					1	1	Х		X	X
		Single charine	Х	Х		2		2	2		4		4		1	1	1	Х	Х	X	X
			X			2 <sup>3)</sup>		2	2		4 <sup>4)</sup>					2	2	Х		X	X
		Dual channel	X	Х		2 <sup>3)</sup>		2	2		4 <sup>4)</sup>		4 <sup>4)</sup>		2	2	2	Х	2	X	X
					Х	2 <sup>3)</sup>	4 <sup>4)</sup>	2	2		4 <sup>4)</sup>					2	2	Х		X	X
	NEMA 4X and NEMA 7		X			2		2	2		4					1	1	Х		X	X
	wall mount	Dual path	X	X		2		2	2		4		4		1	1	1	Х	1	X	X
					Х	2	4	2	2		4					1	1	Х		X	X
		Four path	Х				4 <sup>3)</sup>	4 <sup>3)1)</sup>			4					4		Х		X	
		roui patii	Х	Х			4 <sup>3)</sup>	4 <sup>3)1)</sup>			4 <sup>3)</sup>		4		1	4		Х	4	X	
		Four path	Х				4	4 <sup>1)</sup>			4 <sup>3)</sup>					4		Х		Χ	
		roui patii	Х	Х			4	4 <sup>1)</sup>			4		4		1	4		Х	1	Χ	
		Cingle channel	Х				2		2			1						Х			
		Single channel		Х			2		2			1	1		1			Х	X		
	NEMA 7	Dualaharas	Х				2 <sup>3)</sup>		2 <sup>3)</sup>			2 <sup>3)</sup>						Х			
	compact	Dual channel		Х			<b>2</b> <sup>3)</sup>		2 <sup>3)</sup>			2 <sup>3)</sup>	2 <sup>3)</sup>		2			Х	X		
			Х				2		2			4 <sup>4)</sup>						Х			
		Dual path		Х			2		2			4 <sup>4)</sup>	2		1			Х	X		
FST020	NEMA 4X wall mount	Single channel	Х				1		1			1									
FUP1010		Single channel		Х			1	1	1			2									X
	IP67	Dual channel/ path		Х			2 <sup>3)</sup>	2 <sup>3)</sup>	<b>2</b> <sup>3)</sup>			4 <sup>4)</sup>									х
FUE1010		Single channel	Х	Х		2		2	2		4		4		2	1	1	FM		Х	X
		5	Х	Х		<b>2</b> <sup>3)</sup>		2 <sup>3)</sup>	2 <sup>3)</sup>				2 <sup>3)</sup>		4	2	2	FM		Х	X
	NEMA 4X	Dual channel		Х	Х	<b>2</b> <sup>3)</sup>		2 <sup>3)</sup>	2 <sup>3)</sup>		4 <sup>4)</sup>		2 <sup>3)</sup>		4	2	2	FM		Х	X
			Х	Х		2		2	2		4		2		4	1	1	FM		Х	X
		Dual path		Х	Х	2	4	2	2		4		2		4	1	1	FM		X	X
	NEMA 1 portable	Dual channel/ path	Х	Х			<b>2</b> <sup>3)</sup>	2 <sup>3)</sup>	2 <sup>3)</sup>			4 <sup>4)</sup>	2		4	2	2				X
FUH1010	NEMA 4X and	Single channel	X	Х		2		2	2		4				1	1	1	X		X	
	NEMA 7	Dual path	Х	Х		2		2		2	4		2		1	1	1	Х		X	
	wall mount			X	X <sup>2)</sup>	2	2	2		2	4		2		1	1	1	Х		X	
		Four path <sup>2)</sup>		Х	Х	2	2	2		2	4		2		1	1	1	Х		Χ	
		Single channel	Х	Х			1			1		1			1	1	1	Х			
	NEMA 7 compact	Dual path	Х	Х			2					2			1	1	1	Х			
	oopaot			Х	Х		2			1		1			1	1	1	Х			
FUG1010	NEMA 4X and	Single channel	X	Х		2		2		2	4				1	1	1	Х		X	
	NEMA 7 wall mount	Dual path		Х	Х	2	2	2		2	4		2		1	1	1	Х		X	
	Wan Hount	Four path		Х	Х	2	2	2		2	4		2		1	1	1	Х		Х	
		Single channel	Х	Х			1			1		1			1	1	1	Х			
	NEMA 7		X	X			2					2			1	1	1	X			
	compact	Dual channel		X	Х		2			1		1			1	1	1	X			
				^	^		-											^			

<sup>1)</sup> Fixed to IO adjustment

<sup>&</sup>lt;sup>2)</sup> Not available for Interface Detector

<sup>3)</sup> One per channel

<sup>4)</sup> Two per channel

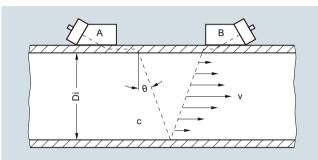
SITRANS F US Clamp-on

## System information SITRANS F US Clamp-on ultrasonic flowmeters

# Function

#### **Operating Principle**

The SITRANS F US system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clampon approach. Ultrasonic sensors transmit and receive acoustic signals directly though the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$$\sin\theta = c / V_{\phi}$$

c = Velocity of sound in fluid

 $V_{0}$  = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensors and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid ( $T_{\rm Fluid}$ ).

The sound waves traveling in the same direction as flow  $(T_{A,B})$  arrive earlier than sound waves traveling against the direction of flow  $(T_{B,A})$ . This time difference  $(\Delta t)$  is used to compute the line integrated flow velocity (v) as shown in the equation below:

$$v = V_{\phi} / 2 \cdot \Delta t / T_{Fluid}$$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

Re = Di · v / visc · Q = K(Re) · 
$$(\pi / 4 \cdot Di^2)$$
 · v

v = Flow velocity

 $visc = \mu / \rho = (dynamic viscosity / density)$ 

K(Re) = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

SITRANS Clamp-On flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation ( $K_{\text{Re}}$ ).

#### Ultrasonic Sensor Types

Three basic types of Clamp-On sensors can be selected for use with the SITRANS F US flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal sensors are selected

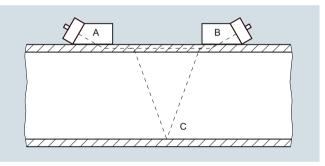
based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the WideBeam sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

The WideBeam sensor is designed for steel pipes, but can also be used with aluminum, titanium and plastic pipe. It is the preferred sensor for HPI and gas applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.

#### Automatic Zero Drift Correction (ZeroMatic Path)

When WideBeam sensors are installed in the "Reflect" mode shown below, the acoustic signal travels in two different paths between sensors A and B. One path "ACB" travels through the pipe wall and fluid, while the other path "AB" never enters the fluid medium.

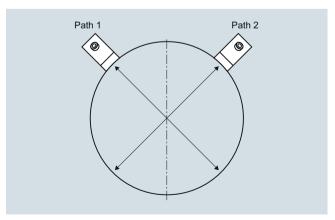


This later path provides the meter with a reference signal that is completely independent of flow rate and can therefore be used as a measure of sensor "mis-match". By continually analyzing this pipe wall signal the SITRANS FUS1010 meter can dynamically correct for flow errors caused by zero drift.

# Multi-Channel Flowmeters

For improved flow profile averaging, redundancy or better cost per measurement, Clamp-On meters can be supplied with 2, 3 or 4 path measurement systems.

In the standard FUS, FUP, FUE systems, these channels can be installed on separate independent lines or in a multi-beam installation as shown below. This choice is made during meter setup, where either a multi-path (two paths on same pipe) or multi-channel installation can be selected.



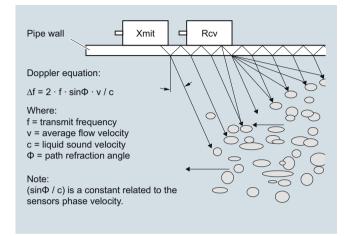
Dual path installation example

SITRANS F US Clamp-on

#### System information SITRANS F US Clamp-on ultrasonic flowmeters

#### Doppler (Reflexor) Operation

The Doppler measurement technique relies on the reflection of sound energy off tiny gas bubbles or suspended particles to create a doppler shift in the fixed frequency acoustic transmit signal, as shown below.



When de-demodulated using FFT signal processing, this doppler shifted frequency ( $\Delta f$ ) can be used to measure the flow rate as described in the associated doppler equations below.

Although the standard transit time measurement system is very tolerant of high levels of liquid aeration and high solids content, there will be cases where insufficient signal will be available for operation with transit time mode. For these cases the FUS, FUP and FUE meters can be ordered with this optional doppler capability, which requires an additional doppler sensor.

#### SITRANS meter family description

#### SITRANS FUS1010 Standard flowmeters

The SITRANS FUS1010 system is a basic function permanent (or dedicated) clamp-on meter that is available with a full range of safety approvals, I/Os and enclosure types. This meter can be used in a wide range of applications but does not include the special functions found in the hydrocarbon FUH and energy FUE flowmeters.

The SITRANS FUS1010 meter is typically programmed with a fixed viscosity and specific gravity entry, which can limit the mass flow and volumetric flow accuracy when highly variable (multi-product) liquid properties flow through the same pipeline.

If this meter is ordered with the Type 3 hardware and program configuration, it will have the ability to accommodate clamp-on RTDs, or an analog input from a temperature transmitter. With an active measurement of liquid temperature the meter can then be programmed to compensate for changes in liquid density and viscosity by mean of a "UniMass" table (for advanced users).

#### SITRANS FST020 Basic flowmeters

The SITRANS FST020 system has the same basic function of the SITRANS FUS1010 system, but does not include the same I/O capability or safety approval rating of the SITRANS FUS1010. This basic meter is intended for single liquid applications that do not require these additional features, such as doppler and unimass. Note that the SITRANS FST020 is not available with hazardous area approvals.

## SITRANS FUP1010 Portable flowmeters

The SITRANS FUP1010 meter has all the capabilities of the SITRANS FUS1010 meter, but in a battery powered portable configuration. This meter is ideal for general flow survey work where high accuracy is required. Note that the FUP meter is not available with hazardous areas approvals.

# SITRANS FUE 1010 Energy flowmeters

By combining clamp-on transit time flow measurement with accurate temperature differential measurement, the SITRANS FUE1010 system provides a solution to thermal energy metering with no interruption of service. Energy measurement can be provided for water, ethylene glycol and brine solutions or steam condensate.

Absolute and differential temperature measurement is accomplished with the use of 2 matched 1 k $\Omega$  RTD elements installed on the supply and return side of the heating or cooling system. Efficiency calculation (kW/ton, EER or COP) is also available in systems with the optional analog input capability, which allow the meter to accept a power meter output.

The SITRANS FUE1010 system is available in both dedicated (IP65 (NEMA 4X)) and portable configurations (IP40).

#### SITRANS FUG1010 Gas flowmeters

# Be sure to contact a Siemens clamp-on specialist before placing a gas system order.

This unique Clamp-On gas meter uses the same WideBeam transit time operating principle described above. However, due to the very low density and sound velocity characteristics of gases, this meter requires a high gain signal amplifier and the installation of a pipe damping material.

The pipe damping material consists of an adhesive backed viscoelastic film that is designed to attenuate any stray acoustic transmit energy that may otherwise interfere with the transit time gas signal. Damping material installation requires a clean (grease free) pipe surface with well bonded paint.

The Clamp-On gas meter is capable of operation on most gases (natural gas, oxygen, nitrogen, carbon monoxide, etc) with a typical minimum operating pressure of 10 barg (145 psig). Low molecular weight gases such as helium or hydrogen can also be measured, but at a higher minimum pressure.

Standard volume computation: Can provide a standard volume or mass flow output for fixed gas compositions. All SITRANS FUG1010 Gas meters include analog input capability that can be used for pressure and temperature compensation. With the installation of an AGA8 lookup table this meter can dynamically adjust the compressibility factor ( $Z_{act}$ ) in response to changes in gas pressure and temperature, as indicate below:

Std. Rate =  $Q_{act} * P_{act}/P_{base} * T_{base}/T_{act} * Z_{base}/Z_{act}$ 

## SITRANS FUH1010 Oil flowmeters

There are three models of flowmeters included in the SITRANS FUH1010 family, a precision volume model, used for applications that will flow a wide range of viscosity, a standard volume (mass) model, and an interface detection model. All models rely on a variable referred to as "Liquident", which is used to infer the liquid's viscosity and optionally the liquid's density. This variable represents the measured liquid sonic velocity compensated by the operating temperature and pressure, so for a given liquid product the measured Liquident output will remain constant over a wide range of pressure or temperature.

#### Precision Volume Option:

This is the lower cost SITRANS FUH1010 meter option that uses the Liquident variable to infer only the actual liquid viscosity. This meter does NOT provide the standard volume, mass flow, liquid identification or density output available in the standard volume meter option described below. The precision volume meter is suitable for any petroleum application where actual volume required as the input to an external RTU or flow transmitter.

## SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

#### Standard Volume Option:

This Liquident variable can also be used to identify the liquid's name (gasoline, fuel oil, crude oil, etc) as well as it's physical properties (specify gravity, API, viscosity and compressibility) at base conditions. With this information the meter can be configured to output a temperature and pressure compensated (standard) volume flow rate using the API 2540 and API MPMS chapter 11.2.1 methods as shown below.

#### **Correction for Temperature:**

Compute Thermal Expansion Coefficient (a<sub>h</sub>):

$$\alpha_b = KO / \rho_b^2 + K1 / \rho_b$$

where: KO and K1 are constants dependent on type of liquid and ρb is the liquid density at base conditions

Compute temperature correction factor (K<sub>T</sub>):

$$K_T = \rho_b^* EXP (-\alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$$

where:  $\Delta T = (T - base temperature)$ 

#### **Correction for Pressure:**

Compute Compressibility Factor (F):

$$F = EXP(A + BT + (C + DT) / \rho_b^2$$

where: A, B, C and D are constants, and "T" is liquid

temperature

Compute pressure correction factor (Kp):

$$K_p = 1 / (1 - F (P_{act} - P_{base}) * 10^{-4})$$

Available outputs from this meter include: API, Density, Mass Flowrate, Standard Volume Flowrate and Liquid Identification.

#### Interface Detection Option:

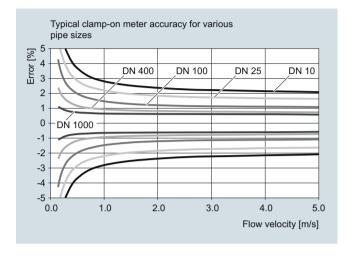
This meter option is designed to provide all the Non-Flow capabilities of a DV meter, making it an ideal non-intrusive alternative to a densitometer. Be aware that this meter does NOT measure flow rate.

#### SITRANS FUT1010 Liquid and gas flowmeters

The SITRANS FUT1010 is available in two different configurations; a version for liquid hydrocarbon applications and a version for precise gas measurement. Both versions are offered in pipe sizes ranging from 4 inch to 24 inch (DN100 to DN 600) with flange ratings of ANSI Class gas.

General Installation Guidelines for transit time Clamp-On Sensor

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph below for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review



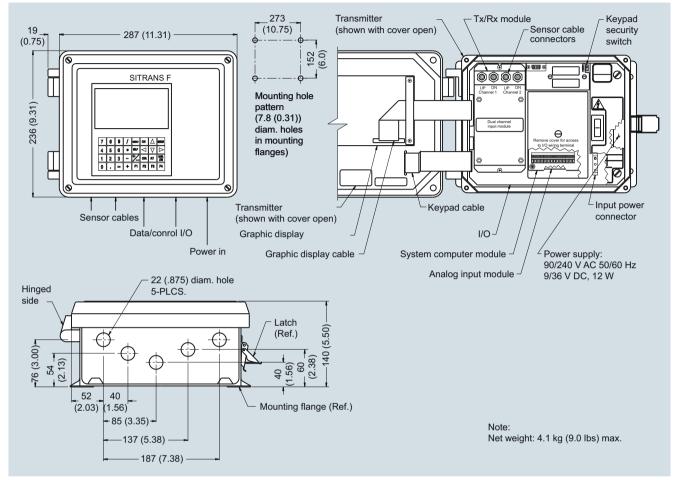
- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves. A minimum of 20 upstream diameters is recommended for clamp-on gas systems
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between 1000 < Re < 5000 should be avoided for best accuracy</li>
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

SITRANS F US Clamp-on

## System information SITRANS F US Clamp-on ultrasonic flowmeters

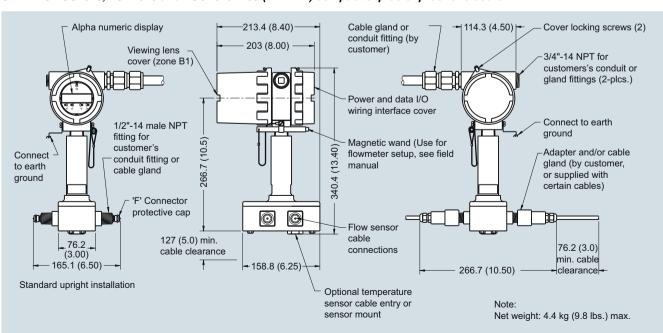
## Dimensional drawings

# SITRANS FUS1010, FUE1010, FUH1010, FUT1010 and FUG1010 IP65 (NEMA 4X) wall mount enclosure



Dimensions in mm (inch)

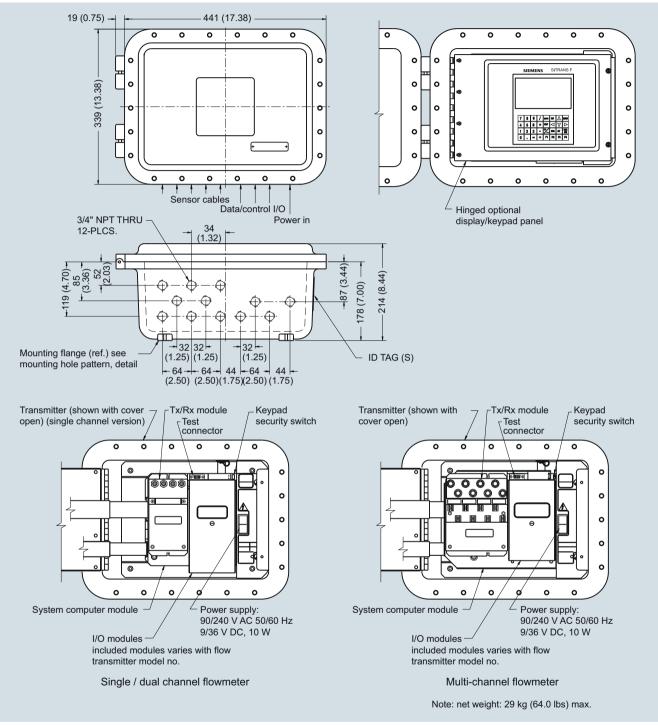
## SITRANS FUS1010, FUH1010 and FUG1010 IP65 (NEMA 7) compact explosion proof enclosure



SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

## SITRANS FUS1010, FUH1010, FUT1010 and FUG1010 IP66 (NEMA 7) wall mount explosionproof enclosure

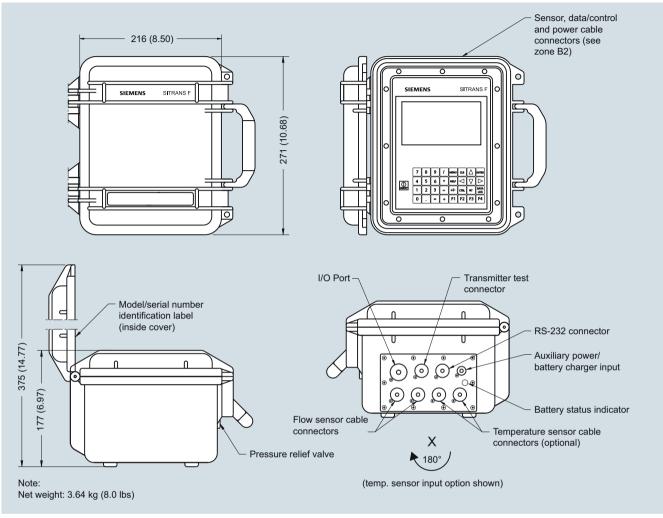


DImensions in mm (inch)

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

# SITRANS FUP1010 IP67 Weatherproof impact resistant enclosure

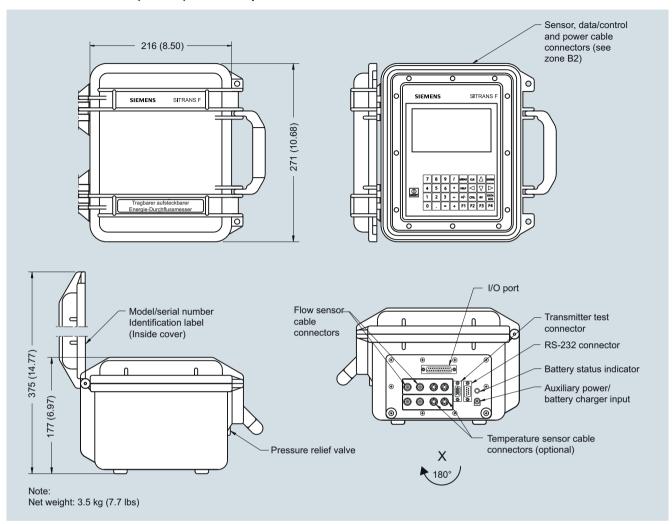


DImensions in mm (inch)

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

# SITRANS FUE1010 IP40 (NEMA 1) Portable impact resistant enclosure

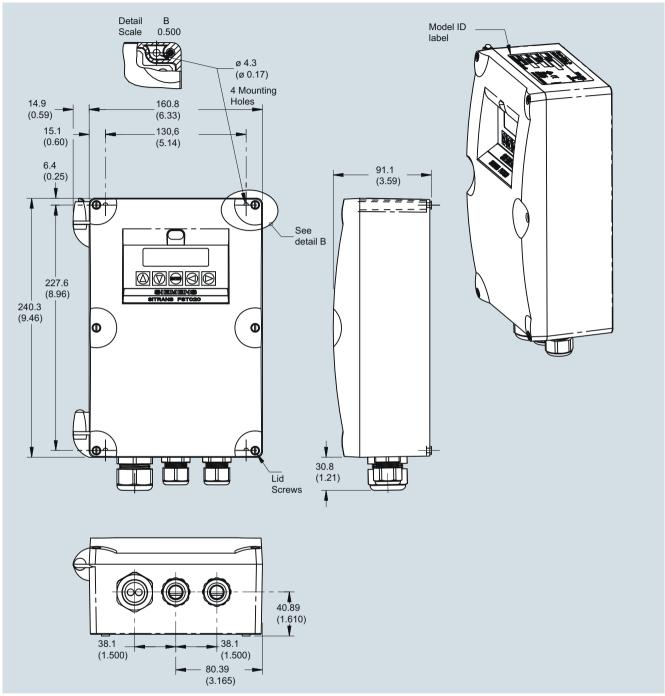


Dimensions in mm (inch)

SITRANS F US Clamp-on

# System information SITRANS F US Clamp-on ultrasonic flowmeters

# SITRANS FST020 IP65 (NEMA 4X) wall mount enclosure



Dimensions in mm (inch)

SITRANS F US Clamp-on

Thickness gauge

#### Overview



The thickness gauge is used to measure the wall thickness of the pipe that a clamp-on ultrasonic flowmeter is installed on. The wall thickness value is a vital factor in the flow computation model and a prerequisite for precise clamp-on ultrasonic flow measurement. When measuring any pipe wall thickness the thickness gauge can also be used as a stand-alone tool used to measure the wall thickness of any metallic or non-metallic pipe materials capable of acting as an ultrasonic wave conductor.

#### Benefits

The thickness gauge is an indispensable tool in accurate clampon ultrasonic flow measurement. For a flowmeter to measure correctly it needs to know the exact wall thickness of the pipe it is measuring on. Since even the smallest miscalculation can have a major effect on the flow reading, the pipe thickness gauge has to be extremely precise. This is why the standard probe operates at a 5 MHz frequency making it capable of measuring pipe thickness ranging from 0.1 to 200 mm (0.03" to 7.9") with a very high resolution of up to 0.1 mm (0.004").

## Application

The thickness gauge can be used in any field application where there is a need for flow measurement.

## Design

The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipe. Such materials include steel, aluminum, titanium, plastics and ceramics. Measurement results are shown in either inches or millimeter; only a simple pre-calibration to a known thickness or sound velocity is required. The simple-to-read 4-digit LCD display featuring a basic user friendly menu is easily navigable with only three conveniently located push buttons. The lightweight computing unit weighs a mere 150 g (5.3 oz) making it ideal for quick and easy on-site pipe wall thickness measurement and with two AAA alkaline batteries trouble-free operation is ensured for 250 hours.

#### Function

The thickness gauge measurement is based on the transit time ultrasonic wave propagation principle: a high frequency ultrasonic beam is transmitted into the pipe being measured through a probe acting as a sender and receiver. When the probe subsequently retrieves that same signal, an internal counter calculates the time taken for the signals to be sent and received through the pipe. This value is used to evaluate the speed of sound through the pipe and consequently, the thickness of the pipe wall.

#### Technical specifications

4-digit LCD Display type 0.1 mm (0.004") Display resolution Measurement units Metric and imperial 1 000 ... 9 999 m/s Sound velocity range (3 280 ... 32 805 ft/s) Operating temperature -10 ... +50 °C (14 ... 122 °F) Probe/pipe temperature 70 °C (158 °F) Update rate 4 Hz Frequency 5 MHz Power source 2 x 1.5 V AAA dry cells Power consumption Working current is less than 3 mA Approx. 250 h on a set of Battery life batteries Dimensions (W x H x D) 61 x 108 x 28 mm (2.4 x 4.3 x 1.1")

Selection and Ordering data

Article No.

150 g (5.3 oz)

Thickness gauge

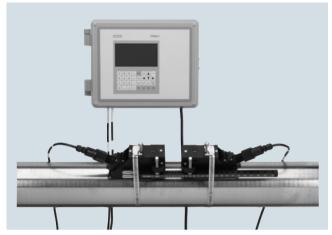
Weight

7ME3951-0TG20

SITRANS F US Clamp-on

#### SITRANS FUS1010 (Standard)

#### Overview



SITRANS FUS1010 is the most versatile clamp-on ultrasonic flow display transmitter available today. It can operate in either Wide-Beam Transit time or Reflexor (Doppler) mode, making it suitable for virtually any liquid, even those with high aeration or suspended solids.

SITRANS FUS1010 is available in single, dual and optional four path configurations, with your choice of IP65 (NEMA 4X) wall mount, IP65 (NEMA7) compact explosion proof enclosures.

#### Benefits

- Versatility; there is no need to change meters when operating conditions change
- · Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- · No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single channel or dual channel/dual path, with doppler capability. Four channel/four path optional.
  - Optional four channels allow measurement of four independent pipes at the same time, reducing overall ownership costs
  - Dual mode allows for transit time and reflexor operation at the same time on the same pipe
  - Dual path allows for two sets of sensors to be set up on one pipe and averaged for higher accuracy
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

## Application

SITRANS FUS1010 is suitable for a wide variety of liquid applications, including the following:

- Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot and cold water systems
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- · Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

# Design

SITRANS FUS1010 is available in three configurations:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single channel
  - Dual channel/dual path
  - Four channel (optional)
- IP65 (NEMA 7) compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single channel
  - Dual channel/dual path
- IP66 (NEMA 7) wall mount explosion proof enclosure constructed of cast aluminum, stainless steel hardware, with glass window
  - Single channel
  - Dual channel/dual path
  - Four channel (optional)

#### Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact flow display transmitter has a 2 x 16 Alphanumeric LCD display
- Current, voltage, status alarm, frequency outputs and communications including HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232 (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language selectable on IP65 (NEMA 7) enclosures<sup>1)</sup>
- Available on NEMA 7 compact as MLFB option, all others are software selectable.

SITRANS F US Clamp-on

SITRANS FUS1010 (Standard)

# Technical specifications

Enclosure IP65 (NEMA 4X)

Data refresh rate

SITRANS FUS1010IP65 (NEMA 4X) wall mount



Input	
Flow range	$\pm$ 12 m/s ( $\pm$ 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s ( 0.001 ft/s), flow rate independent
Pipe size	6.4 mm 9.14 m (0.25" 360")
Optional inputs Single channel	<ul> <li>Current: 20 mA DC</li> <li>Temperature: 4 wire 1 kΩ RTD</li> </ul>
Output	
Standard outputs	<ul> <li>Current: 20 mA DC (1 kΩ at 30 V DC)</li> <li>Voltage: 10 V DC (5 kΩ min.)</li> <li>Status Alarm: 4 x SPDT relays</li> <li>Form C relays</li> <li>Pulse rate: 5 kHz</li> </ul>
Optional outputs	<ul> <li>Expanded I/Os (additional 4 20 mA outputs) with form C relays</li> <li>UniMass (requires RTD)</li> <li>Communications: HART, BACnet MSTP/BACnet IP, Modbus RTU &amp; TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232</li> </ul>
Accuracy	
Accuracy	$\pm0.5$ % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) $\pm0.0015$ 0.003 m/s ( $\pm0.005$ 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	$\pm0.15$ % of flow, for velocities greater than 0.3 m/s (1 ft/s) $\pm0.0005$ m/s ( $\pm0.0015$ ft/s), for velocities less than 0.3 m/s (1 ft/s)

5 Hz

Rated operation conditions	
Degree of protection	IP65 (NEMA 4X)
Liquid temperature	
<ul> <li>Standard</li> </ul>	-40 +120 °C (-40 +250 °F)
Optional	-40 +230 °C (-40 +450 °F)
Ambient temperature	-18 +60 °C (0 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC, 12 W
Indication and operation	
Data logger memory	1 MByte
Display	128 x 240 pixel LCD with back- light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French selectable by software
Certificates and approvals	
FM and CSA ratings	Transmitter
	N-I Class I, Div 2 S Class II. Div 2
	• Sensor
	I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX ratings	Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5
	• Sensors: Ex II 1 G Ex ia IIC T5
IECEx	Pending

SITRANS F US Clamp-on

# SITRANS FUS1010 (Standard)

SITRANS FUS1010, IP65 (NEMA 7) compact explosionproof



± 12 m/s (± 40 ft/s), bidirectional
0.0003 m/s ( 0.001 ft/s), flow rate independent
6.4 mm 9.14 m (0.25" 360")
Current: 20 mA DC
• Temperature: 4 wire 1 kΩ RTD
<ul> <li>Current (externally powered):</li> <li>1 x 4 20 mA DC</li> <li>(1 kΩ at 30 V DC)</li> </ul>
<ul> <li>Status Alarm: 1 x Isolated open collector</li> </ul>
<ul> <li>Pulse rate: 5 kHz</li> </ul>
• VT100 RS 232
± 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
$\pm$ 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) $\pm$ 0.0005 m/s ( $\pm$ 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
5 Hz
IP65 (NEMA 7)
-40 +120 °C (-40 +250 °F)
-40 +230 °C (-40 +450 °F)
-18 +60 °C (0 140 °F)
see SITRANS F US Clamp-on "System info and selection guide"
see diagrams

Power supply	90 240 V AC, 50 60 Hz, 15 VA or 9 36 V DC, 10 W
	9 36 V DC, 10 W - ground
	9 36 V DC, 10 W + ground
Indication and operation	
Data logger memory	1 MByte
Display	2 x 16 alphanumeric LCD display
Keypad	5 Magnetic hall effect switches
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
FM and CSA ratings	<ul> <li>Transmitter</li> </ul>
	XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2
	• Sensor
	I.S. Class I, II, Div 1
ATEX ratings	• Flow transmitter: Ex II 2 (1) G Ex d [ia] IIB + H2 T5
	<ul> <li>Sensors: Ex II 1 G Ex ia IIC T5</li> </ul>
IECEx	Pending
CE	EMC Directive 2004/108/EC
	ATEX Directive 94/9/EC

# **Flow Measurement** SITRANS F US Clamp-on

# SITRANS FUS1010 (Standard)

# SITRANS FUS1010 IP66 (NEMA 7) wall mount explosion proof



Enclosure IP66 (NEMA 7)	
Input	
Flow range	$\pm$ 12 m/s ( $\pm$ 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s ( 0.001 ft/s), flow rate independent
Pipe size	6.4 mm 9.14 m (0.25" 360")
Optional Inputs	Current: 20 mA DC
per channel	<ul> <li>Temperature: 2 x 4 wire 1 kΩ</li> <li>RTD</li> </ul>
Output	
Outputs single channel	<ul> <li>Current: 20 mA DC (1 kΩ at 30 V DC)</li> <li>Voltage: 10 V DC (5 kΩ min.)</li> <li>Status Alarm: 4 x SPDT Relays</li> <li>Pulse rate: 5 kHz</li> <li>Communications: HART, BACnet MSTP/BACnet IP, Modbus RTU &amp; TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232</li> </ul>
Accuracy	
Accuracy	± 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	IP66 (NEMA 7)
Liquid temperature	
• Standard	-40 +120 °C (-40 +250 °F)
Optional	-40 +230 °C (-40 +450 °F)
Ambient temperature	-18 +60 °C (0 140 °F)
Design	
Dimensions	and CITDANIC FILIC Clamp on
	see SITRANS F US Clamp-on "System info and selection guide"

Power supply	90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC, 12 W
Indication and operation	
Data logger memory	1 MByte
Display	128 x 240 pixel LCD with backlight
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
FM and CSA ratings	Transmitter
	XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2
	• Sensor
	I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC
	ATEX Directive 94/9/EC
C-TICK	
ATEX ratings	• Flow transmitter Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB + H2 T5
	<ul> <li>Sensors: Ex II 1 G Ex ia IIC T5</li> </ul>
IECEx	Pending

SITRANS F US Clamp-on

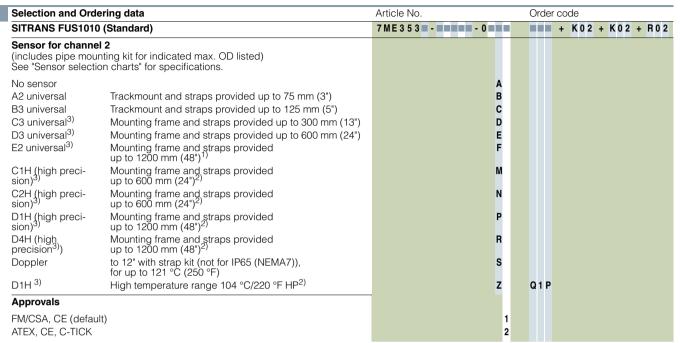
# **SITRANS FUS1010 (Standard)**

# Standard MLFB for quick delivery on SITRANS FUS1010 (Dedicated standard)

Selection and Ord	ering data	Article No.	Order code
SITRANS FUS1010	0 (Standard)	7 M E 3 5 3 0	+ K02 + K02 + R02
7 Click on the Article     tal.	cle No. for the online configuration in the PIA Life Cycle Por-		
IP65 (NEMA 4X) wa	all mount	0	
Number of channe	els/ultrasonic paths		
Single channel		1	
Dual channel/Dual	path	2	
	ons and I/O configurations isplay and Reflexor capability		
Standard outputs • 2 x 0 10 V • 2 x 4 20 mA • 2 x pulse output • 4 x relay C type		A	
Meter power option	ns		
90 240 V AC		A	
	pt NEMA 7 compact)	В	
Communication o	ptions		
VT100 RS 232 (star	ndard)	0	
RTD temperature	sensor		
(include mounting I No RTDs	nardware for pipes between 1.5" and 24" outer diameter)	0	
1x standard clamp-		1	
2x standard clamp-	on	2	
1x submersible		3	
2x submersible		4	
	1 1 Inting kit and spacer bar for indicated max. OD listed) on charts" for specifications.		
no sensor		A	
A2 universal	Trackmount and straps provided up to 75 mm (3")	В	
B3 universal C3 universal <sup>3)</sup>	Trackmount and straps provided up to 125 mm (5")  Mounting frame and straps provided up to 300 mm (13")	C	
D3 universal <sup>3)</sup>	Mounting frame and straps provided up to 300 mm (13)  Mounting frame and straps provided up to 600 mm (24")	E	
E2 universal <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>	F	
C1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>2)</sup>	М	
C2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>2)</sup>	N -	
D1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>2)</sup>	P	
D4H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>2)</sup>	R	
Doppler	to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)	S	
D1H <sup>3)</sup>	High temperature range 104 °C/220 °F HP <sup>2)</sup>	z	P 1 P

# Flow Measurement SITRANS F US Clamp-on

#### SITRANS FUS1010 (Standard)



Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

Standard MLFB product offering represents 4 to 6 weeks delivery time.

For sensor and RTD cables for quick delivery see tables at end of section.

Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

<sup>3)</sup> Made with stainless steel construction.

SITRANS F US Clamp-on

# SITRANS FUS1010 (Standard)

SITRANS FUS1010 (Standard)		
Selection and Ordering data	Article No.	Ord. code
SITRANS FUS1010 (Standard)  IP65 (NEMA 4X) wall mount  IP65 (NEMA 7) compact explosionproof  IP66 (NEMA 7) wall mount explosionproof	7ME3530- 7ME3531- 7ME3533-	
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths		
Single channel Dual channel/Dual path Special: Four channel/Four path (NEMA 4X wall mount and NEMA 7 wall mount explo- sionproof only)	1 2 9	H 1 A
Flowmeter functions and I/O configurations includes graphic or digital display and Reflexor capability for all except IP65 (NEMA 7) compact units  IP65 (NEMA 4X) wall mount and IP66		
(NEMA 7 wall mount explosionsproof) units  • Standard outputs - 2 x 0 10 V - 2 x 4 20 mA - 2 x pulse output - 4 x relay C type	А	
For H1A multi channel option above:  - 4 x 0 10 V  - 4 x 4 20 mA  - 4 x relay C type  • Standard outputs with optional input adder  - UniMass capability with 2 x RTD input	С	
(1 x RTD only for H1A multi channel option) - 4 x 4 20 mA analog input  Extended outputs plus optional inputs (Dual channel only) Outputs: - 2 x 0 10 V - 2 x 4 20 mA active - 4 x 4 20 mA passive - 2 x 0 5K pulse - 4 x relay C type Inputs: - 4 x 4 20 mA - 1 x RTD inputs per chanel	z	J1B
IP65 (NEMA 7) compact explosionproof units		
Standard outputs  1 x 4 20 mA (Loop) and 1 x status (open collector) per channel  1 x pulse output for single channel units only  Standard outputs.		
<ul> <li>Standard outputs with optional input adder</li> <li>UniMass capability with 1 RTD input (1x RTD only, for H1A multi channel option)</li> <li>1 x analog input per channel</li> </ul>	F	
Meter power options		
90 240 V AC 9 36 V DC (except compact NEMA 7) 9 36 V DC negative GND (compact only) 9 36 V DC positive GND (compact only)	A B J K	

Selection and Orde	ring data	Article No.	Ord	. code
SITRANS FUS1010	(Standard)			
• IP65 (NEMA 7) cor	mpact explosionproof	7ME3530- 7ME3531- 7ME3533-	-1-	
Communication op	tions			
		0 6		
(includes mounting	nardware for pipes	0		
1 x Standard clamp-	on RTD	1		
2 x Standard clamp-	2			
	us RTU & TCP/IP, HART, BACnet //BACnet IP, Ethernet IP, Johnson N2  imperature sensor des mounting hardware for pipes een 1.5" and 24" outer diameter)  TDs andard clamp-on RTD andard clamp-on RTD ubmersible clamp-on RTD ubmersible clamp-on RTD sertion style RTD with thermowell and go sertion style RTD with thermowell and go for for channel 1 ling pipe mounting tracks for sizes A & B rs indented for pipe with a OD less than am (5") and mounting frame/spacer bars es C, D & E sensors. Straps provided are ei indicated maximum OD listed below. kits are available to accommodate larger (refer to spare part list). Refer to "Sensor ition Charts" for the sensor suitability of size and wall thickness".  "nsor iversal Trackmount and straps provided up to 75 mm (3") iversal Trackmount and straps provided up to 125 mm (5") Mounting frame and straps provided up to 300 mm (13") Mounting frame and straps provided up to 600 mm (24")			
	•	4		
1 x Insertion style R lagging	ID with thermowell and	9		N 1 A
00 0	TD with thermowell and	9		N 1 B
sensors indented for 125 mm (5") and mot for sizes C, D & E set for the indicated max Strap kits are availab pipes (refer to spare Selection Charts" for	ing tracks for sizes A & B pipe with a OD less than unting frame/spacer bars sors. Straps provided are imum OD listed below. le to accommodate larger part list). Refer to "Sensor the sensor suitability of			
no sensor A2 universal	provided up to		A B	
B3 universal	Trackmount and straps provided up to		С	
C3 universal <sup>3)</sup>	Mounting frame and straps provided up to		D	
D3 universal <sup>3)</sup>	Mounting frame and straps provided up to		E	
E2 universal <sup>3)</sup>	Mounting frame and		F	

# Flow Measurement SITRANS F US Clamp-on

# SITRANS FUS1010 (Standard)

Selection and Ordering data	Article No.	Ord. co	de	Selection and Ord	dering data	Article No.	Ord. o
SITRANS FUS1010 (Standard)				SITRANS FUS101	I0 (Standard)		
IP65 (NEMA 4X) wall mount     IP65 (NEMA 7) compact explosionproof     IP66 (NEMA 7) wall mount explosionproof	7ME3530- 7ME3531- 7ME3533-			, ,	wall mount compact explosionproof vall mount explosionproof	7ME3530- 7ME3531- 7ME3533-	
Sensor for channel 1 (continued)	0 -			Sensor for chann	nel 2	0 -	
For the following A1H to D4H sensors, temperature range is -40 °C 65 °C A2H (high precision) Trackmount and straps provided up to		н		(includes pipe mo max. OD listed) See "Sensor select specifications.	unting kit for indicated		
75 mm (3") A3H (high precision) Trackmount and straps provided up to 75 mm (3")		J		no sensor A2 universal	Trackmount and straps provided up to 75 mm (3")		В
B1H (high precision) Trackmount and straps provided up to 125 mm (5")		К .		B3 universal	Trackmount and straps provided up to 125 mm (5")		С
B2H (high precision) Trackmount and straps provided up to 125 mm (5") C1H (high preci- Mounting frame and		M		C3 universal <sup>3)</sup>	Mounting frame and straps provided up to 300 mm (13")		D
sion) <sup>3)</sup> straps provided up to 600 mm (24") C2H (high preci- Mounting frame and		N N		D3 universal <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24")		E
sion) <sup>3)</sup> straps provided up to 600 mm (24") D1H (high preci- Mounting frame and		Р		E2 universal <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		F
sion) <sup>3)</sup> straps provided up to 1200 mm (48") <sup>2)</sup> D2H (high preci- sion) <sup>3)</sup> Mounting frame and straps provided up to		Q		perature range is -	A1H to D4H sensors, tem- -40 °C to 65 °C nominal 21 °C (70 °F):		Ш
1200 mm (48") <sup>2)</sup> D4H (high precision) <sup>3)</sup> Mounting frame and straps provided up to		R		, , ,	on) Trackmount and straps provided up to 75 mm (3")		Н
1200 mm (48") <sup>2)</sup> Doppler to 12" with strap kit (not for IP65 (NEMA 7)),		s			on) Trackmount and straps provided up to 75 mm (3")		J
for up to 121 °C (250 °F High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam.	)	Z P 1	I A	, , ,	on) Trackmount and straps provided up to 125 mm (5")		K
(1.18 to 7.67 inch diam.)) High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam.		Z P 1	I B	B2H (high precision	on) Trackmount and straps provided up to 125 mm (5")		L
(5.90 to 24 inch diam.)) High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam.		Z P 1	ı C	C1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24")		M
(15.75 to 47.25 inch diam.)) For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F u				C2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24")		N
to 220 °F), nominal 65 °C (150 °F): B1H (high temperature range HP)		Z P1		D1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48")e <sup>2)</sup>		P
B2H (high temperature range HP) C1H (high temperature range HP) <sup>3)</sup> C2H (high temperature range HP) <sup>3)</sup>		Z P1 Z P1 Z P1	I M	D2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>2)</sup>		Q
D1H (high temperature range HP) <sup>2)3)</sup> D2H (high temperature range HP) <sup>2)3)</sup>		Z P 1 Z P 1	I P I Q	D4H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>2)</sup>		R
D4H (high temperature range HP) <sup>2)3)</sup>		Z P 1	K	Doppler	to 12" with strap kit (not for IP65 (NEMA 7)), for up to 121 °C (250 °F)		S

# SITRANS F US Clamp-on

# **SITRANS FUS1010 (Standard)**

Selection and Ordering data	Article No.	Ord	. code
SITRANS FUS1010 (Standard)			
<ul> <li>IP65 (NEMA 4X) wall mount</li> <li>IP65 (NEMA 7) compact explosionproof</li> <li>IP66 (NEMA 7) wall mount explosionproof</li> </ul>	7ME3530- 7ME3531- 7ME3533- 0 -		
Sensor for channel 2 (continued)			
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))		Z	Q 1 A
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))		Z	Q 1 B
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))		Z	Q1C
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F): B1H (high temperature range HP)		z	Q 1 K
B2H (high temperature range HP)		Z	Q1L
C1H (high temperature range HP) <sup>3)</sup>		Z	Q 1 M
C2H (high temperature range HP) <sup>3)</sup>		Z	Q1N
D1H (high temperature range HP) <sup>2)3)</sup> D2H (high temperature range HP) <sup>2)3)</sup>		Z	Q1P Q1Q
D4H (high temperature range HP) <sup>2)3)</sup>		Z	Q1R
Approvals	-		
FM/CSA, CE		1	
ATEX, CE, C-TICK		2	

Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

Selection and Ordering data	Order code
Further designs	
Please add "-2" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for No. of channels) See "Sensor cable selection chart"	К
Cable assembly for RTDs (add for No. of RTDs) See "RTD cable selection chart"	R
Cable termination kit (for one cable pair)	
<ul> <li>Termination for standard, plenum and armored sensor cable</li> </ul>	T01
• Termination for submersible sensor cable	T11
<ul> <li>RTD cable termination kit for standard RTD</li> <li>RTD cable termination kit for submersible RTD</li> <li>Insert RTD cable termination kit</li> <li>Cable gland kit</li> </ul>	T21 T31 T41 T51
Languages (Meter and Documentation), English (default) for compact NEMA 7 only	
<ul><li>German</li><li>French</li><li>Spanish</li><li>Italian</li></ul>	B10 B12 B13 B14
Wet flow transfer calibration (priced on request) 6 point calibration 2/water (Price per channel)	
<ul> <li>2SS40 pipe</li> <li>3CS40 pipe</li> <li>4CS40 pipe</li> <li>4SS40 pipe</li> <li>6CS40 pipe</li> <li>6SS40 pipe</li> </ul>	D01 D02 D03 D04 D05 D06
• 6CS120 pipe • 8CS40 pipe	D07 D08
<ul><li>8SS40 pipe</li><li>8CS120 pipe</li><li>10CS Standard pipe</li><li>10CS40 pipe</li></ul>	D09 D10 D11 D12
<ul><li>10SS40 pipe</li><li>12CS Standard pipe</li><li>12CS40 pipe</li><li>14CS30 pipe</li></ul>	D13 D14 D15 D16
<ul><li>14CS40 pipe</li><li>16CS Standard pipe</li><li>16CS40 pipe</li><li>18CS Standard pipe</li></ul>	D17 D18 D19 D20
<ul><li>20CS20 pipe</li><li>20CS30 pipe</li><li>24CS Standard pipe</li><li>24CS20 pipe</li></ul>	D21 D22 D23 D24
<ul> <li>24CS30 pipe</li> <li>30CS Standard pipe</li> <li>36CS Standard pipe</li> <li>Other pipe, other liquid, additional points, witness</li> </ul>	D25 D26 D27 Y28
Tag name plate • Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19
Operating Instructions for SITRANS FUS1010	Article No.
English NEMA 4X wall mount & NEMA 7 wall mount explosion proof	A5E02951520
German NEMA 4X & wall mount NEMA 7 wall mount explosionproof	A5E02951532
NEMA 7 compact explosionproof  This device is shipped with a Quick Start guide and a	CQO:1010XFM-3

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumtenion

<sup>&</sup>lt;sup>2)</sup> Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

<sup>3)</sup> Made with stainless steel construction.

SITRANS F US Clamp-on

# **SITRANS FUS1010 (Standard)**

# MLFB example

## Application example

A clamp-on meter is required for a 12" carbon steel jet fuel line, with a wall thickness of 12.7 mm (0.5"). Meter electronics are to be located in a Class I Div 2 area only 18 m (60 ft) from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement.

MLFB Article No.: **7ME3530-2AB00-0QQ1-Z** 

K03 + K03

Selection and Ordering data	Article No. Ord. code
SITRANS FUS1010 meter family	7 ME 3 5 3 - 0 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0
IP65 (NEMA 4X) enclosure	0
Dual Path	2
Standard I/O option	A
9 36 V DC power option	В
RS 232 Standard	0
No RTD required	0
Sensor code for path 1	Q
Sensor code for path 2	Q
FM approval required	1
30 m (100 ft) sensor cable for path 1	K 0 3
30 m (100 ft) sensor cable for path 2	K 0 3

## Universal sensor selection chart IP68

Based on pipe size (pipes other than steel)						
Sensor	Order Code	Outer diam (mm)	neter range	Outer diameter range (inch)		
Pipe size		min.	max.	min.	max.	
A2	В	12.7	50.8	0.5	2	
B3	С	19	127	0.75	5	
C3 <sup>1)</sup>	D	51	305	2	12	
D3 <sup>1)</sup>	E	203	610	8	24	
E2 <sup>1)</sup>	F	254	6 096	10	240	

## High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Sensor	Order	Pipe wall (	Pipe wall (mm)		inch)
Pipe wall	Code	min.	max.	min.	max.
A1H	G	0.64	1.02	0.025	0.04
A2H	Н	1.02	1.52	0.04	0.06
АЗН	J	1.52	2.03	0.06	0.08
B1H	K	2.03	3.05	0.08	0.12
B2H	L	3.05	4.06	0.12	0.16
C1H <sup>1)</sup>	М	4.06	5.84	0.16	0.23
C2H <sup>1)</sup>	N	5.84	8.13	0.23	0.32
D1H <sup>1)</sup>	P	8.13	11.18	0.32	0.44
D2H <sup>1)</sup>	Q	11.18	15.75	0.44	0.62
D4H <sup>1)</sup>	R	15.75	31.75	0.62	1.25

<sup>1)</sup> Made with stainless steel construction.

## Sensor cable (pair) selection chart

Sensor cable	Sensor cable codes for length and type options						
Cable length m (ft)	Standard (PVC jacket)	Submersible (polyethylene jacket)	Plenum Rated (teflon jacket)	Armored			
	-40+80 °C (-40+176 °F)	-40+80 °C	-40+200 °C (-40+392 °F)	-40+80 °C (-40+176 °F)			
	Order code						
6 (20)	<b>K01</b> <sup>1)</sup>	K11	K21	K31			
15 (50)	<b>K02</b> <sup>1)</sup>	K12 <sup>1)</sup>	K22	<b>K32</b> <sup>1)</sup>			
30 (100)	<b>K03</b> <sup>1)</sup>	<b>K13</b> <sup>1)</sup>	K23	K33			
46 (150)	<b>K04</b> <sup>1)</sup>	K14	K24	K34			
61 (200)	K05	K15	K25	K35			
91 (300)	<b>K06</b> <sup>1)</sup>	K16	K26	K36			

## RTD cable (single) selection chart

RTD cable codes for length and type						
Cable length m (ft)	Standard (teflon wrapped) -40 +200 °C (-40 +392 °F)	Submersible (extruded jacket) -40 +200 °C (-40 +392 °F)				
	Order code					
6 (20)	R01 <sup>1)</sup>	R11				
15 (50)	<b>R02</b> <sup>1)</sup>	R12				
30 (100)	<b>R03</b> <sup>1)</sup>	R13				
46 (150)	R04	R14				
61 (200)	R05	R15				
91 (300)	R06	R16				

<sup>1)</sup> Standard MLFB for quick delivery

SITRANS F US Clamp-on

#### SITRANS FST020 (Basic)

#### Overview



SITRANS FST020 offers reliable flow measurement at a much lower cost than other clamp-on ultrasonic flowmeters, with flow rate accuracy of  $\pm$  0.5 % to 1.0 % for most applications.

#### Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to wear or foul
- No pressure drop or energy loss
- Compact, integral design reduces installation cost
- Wide turn-down ratio
- Optional WideBeam technology ensures high performance.
- ZeroMatic Path automatically sets zero without stopping flow and eliminates zero drift.

## Application

SITRANS FST020 is suitable for most clean liquid applications, including the following:

- Water & wastewater industry
  - Potable water
  - Wastewater, influent & effluent
  - Processed sewage, sludge
- Chemical feed industry
- Sodium hypochlorite
- Sodium hydroxide
- HVAC & power industries
  - Coolant flow
  - Fuel flow
- · Process control
  - Chemicals
  - Pharmaceuticals

The SITRANS FST020 flowmeter is not available with hazardous areas approval.

#### Design

- IP65 (NEMA 4X) wall mount constructed of polycarbonate
- · Single channel versions only

# Function

- 2 x16 integral alphanumeric display and 5 key keypad for installation menu and data display
- Pulse rate output
- Communications include VT100 RS 232 with a DB9 connector, Modbus RTU, BACnet MSTP
- Totalizer start/stop and rest control lines.
- Remote PC installation menu
- ZeroMatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site & data logger storage
- Menu language in English, Spanish, German, Italian and French

## Technical specifications

-	
Input	
Flow range	± 12 m/s (± 40 ft/s), bi-directional
Flow sensitivity	0.0003 m/s (0.001 ft/s) flow rate independent
Digital Inputs	
Totalizer Hold	Optically isolated diode Input voltage: 2 10 V DC
Totalizer Reset	Optically isolated diode Input voltage: 2 10 V DC
Output	
Current	<ul><li>4 20 mA (Isolated)</li><li>externally powered</li><li>10 30 V DC</li></ul>
Relay	<ul><li>Programmable Form C 250 mA</li><li>30 V DC</li><li>3 V A max</li></ul>
Pulse rate <sup>1)</sup>	Optically isolated transistor 10 mA     30 V DC max
Accuracy	For velocities ≥ 0.3 m/s (1 ft/s)
• 4 20 mA	± 1.0 % of flow
<ul> <li>Pulse, relay output</li> </ul>	± 0.5 % 1.0 % of flow
Batch repeatability	± 0.15 %
Zero Drift	0.1 % of rate; 0.0003 m/s (0.001 ft/s)
Data refresh rate	5 Hz
Transmitter conditions	
Operating temperature	-10 +50 °C (14 +122 °F)
Storage temperature	-20 +60 °C (-4 +140 °F)
Degree of protection	IP65 NEMA 4X
Design	
Weight	1.4 kg (3.0 lb)
Dimensions (W x H x D)	175 x 235 x 92 mm (6.89 x 9.25 x 3.62 inch)
Enclosure material	Polycarbonate
Power supply	100 240 V AC @ 20 VA or 11.5 28.5 V DC @ 10 W
Certificates and approvals	
Unclassified locations	UL, UL <sub>c</sub>
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	

When used to represent flow rate (PGEN) the frequency can reach as high as 5000 Hz. When used to represent flow total it can reach 50 Hz.

# Flow Measurement SITRANS F US Clamp-on

SITRANS FST020 (Basic)

# Standard MLFB for quick delivery on SITRANS FST020 (Basic)

Selection and Ordering data		Article No.
SITRANS FST020 (Basic)		7 M E 3 5 7 - 3 0 - 0
	online configuration in the PIA Life Cycle Portal.	
Design		
IP65 (NEMA 4X ) wall mount		0
Number of channels/ultrasonic Single channel	paths	
Flowmeter functions and I/O co	onfigurations	
With display and 1 additional a	nalog output and SPST relay	н
Meter power options		
100 240 V AC		A
11.5 28.5 V DC, 10 W max		В
Sensor (includes pipe mounting kit for in See "Sensor selection charts" for		
no sensor		A
A2 universal	Trackmount and straps provided up to 75 mm (3")	В
B3 universal	Trackmount and straps provided up to 125 mm (5")	С
C3 universal <sup>2)</sup>	Mounting frame and straps provided up to 300 mm (13")	D
D3 universal <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24")	E
E2 universal <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>	F
For the following A1H to C1H sens	ors, temperature range is -40 65 °C (-41 150 °F), nominal 21 °C (70 °F)	
C1H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24")	М
C2H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24")	N
D1H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>	P
D4H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>	R
Sensor cables		
No sensor cable		
6 m (20 ft) PVC Jacket (1 pr)		
15 m (50 ft) PVC Jacket (1 pr)		
30 m (100 ft) PVC Jacket		
46 m (150 ft) PVC Jacket		
91 m (300 ft) PVC Jacket		

Standard MLFB offering represents 2 to 3 weeks delivery time for quantities under 5.

<sup>1)</sup> Supplied spacer bar suppports pipes up to 750 mm (30 inch). For pipes larger than 750 nn (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

<sup>&</sup>lt;sup>2)</sup> Made of stainless steel construction.

SITRANS F US Clamp-on

# SITRANS FST020 (Basic)

SITHANS F31020			
Selection and Order		Article No.	Ord. code
SITRANS FST020 (B	asic) IP65 (NEMA 4x)	7ME3570-	
✓ Click on the Article guration in the PIA	e No. for the online confi-	3 0 - 0	
Number of channels	,		
Single channel	ditiasonic patris	1	
Flowmeter functions	and I/O configure		
tions	•		
<ul> <li>With display, keypad 1x pulse/frequency, RS232, Modbus RT</li> </ul>	d, 1x 4 20 mA, 1x relay, 2x digital input, VT100 U, BACnet MSTP	Н	
Meter power options	3		
100 240 V AC 11.5 28.5 V DC		A B	
B universal sensors ir OD less than 125 mm frame/spacer bars for sensors. Straps provi maximum OD listed b available to accomm to spare part list). Rei	ing tracks for Sizes A & ndented for pipe with a n (5") and mounting sizes C, D & E universal ded are for the indicated		
no sensor			A
A2 universal	Trackmount and straps provided up to		В
B3 universal	75 mm (3") Trackmount and straps provided up to		С
	125 mm (5")		
C3 universal <sup>2)</sup>	Mounting frame and straps provided up to		D
D3 universal <sup>2)</sup>	330 mm (13") Mounting frame and straps provided up to 600 mm (24")		E
E2 universal <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48")		F
nominal 21 °C (70 °F)	o D4H transducers, 40 65 °C (-41 150 °F),		
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		Н
A3H (high precision)	Trackmount and straps provided up to 75 mm (5")		J
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		K
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L
C1H (high precision) <sup>2)</sup>	up to 600 min (24") with mounting hardware		М
C2H (high precision) <sup>2)</sup>	up to 600 min (24") with mounting hardware		N
D1H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		P
D2H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		Q
D4H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		R

High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1 to 8 inch diam.))  High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. 6 to 24 inch diam.))	Selection and Ordering data	Article No.	Ord	. code
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1 to 8 inch diam.))  High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. 6 to 24 inch diam.))  High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (16 to 48 inch diam.))  Sensor cables (pair)  No sensor cable 6 m (20 ft) PVC Jacket 8 B 15 m (50 ft) PVC Jacket 9 D A6 m (150 ft) PVC Jacket 9 D A6 m (200 ft) PVC Jacket 9 D A6 m (200 ft) PVC Jacket 9 D A6 m (200 ft) PVC Jacket 9 D D A6 m (200 ft) PVC Jacket 9 D D D D D D D D D D D D D D D D D D	SITRANS FST020 (Basic) IP65 (NEMA 4x)	7ME3570-		
230 °C (446 °F) (30 to 200 mm diam. (1 to 8 inch diam.)) High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. 6 to 24 inch diam.)) High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (16 to 48 inch diam.))  Sensor cables (pair) No sensor cable 6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket 20 m (100 ft) PVC Jacket 61 m (200 ft) PVC Jacket 6 m (150 ft) PVC Jacket 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 46 m (150 ft) Plenum rated (Teflon jacket) M (150 ft) Plenum rated (Teflon jacket) M (150 ft) Plenum rated (Teflon jacket) N (Approvals		30-0		
230 °C (446 °F) (150 to 610 mm diam. 6 to 24 inch diam.))  High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (16 to 48 inch diam.))  Sensor cables (pair)  No sensor cable 6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket 20 m (100 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (200 ft) PVC Jacket 6 m (20 ft) PVC Jacket 6 m (20 ft) PVC Jacket 6 m (20 ft) PVC Jacket 7 m (300 ft) PVC Jacket 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 15 m (300 ft) Plenum rated (Teflon jacket) 16 m (300 ft) Plenum rated (Teflon jacket) 17 m (300 ft) Plenum rated (Teflon jacket) 18 m (300 ft) Plenum rated (Teflon jacket) 19 m (300 ft) Plenum rated (Teflon jacket)	230 °C (446 °F) (30 to 200 mm diam. (1 to 8 inch diam.))			P1A
230 °C (446 °F) (400 to 1200 mm diam. (16 to 48 inch diam.))  Sensor cables (pair)  No sensor cable 6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket 20 m (100 ft) PVC Jacket 46 m (150 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (300 ft) PVC Jacket 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 30 m (100 ft) Plenum rated (Teflon jacket) 46 m (150 ft) Plenum rated (Teflon jacket) 46 m (200 ft) Plenum rated (Teflon jacket) M (150 ft) Plenum rated (Teflon jacket) M (150 ft) Plenum rated (Teflon jacket) N (Approvals	230 °C (446 °F) (150 to 610 mm diam.		Z	P 1 B
No sensor cable 6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket 20 m (100 ft) PVC Jacket 46 m (150 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (200 ft) PVC Jacket 61 m (300 ft) PVC Jacket 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) J 30 m (100 ft) Plenum rated (Teflon jacket) K 46 m (150 ft) Plenum rated (Teflon jacket) K 46 m (200 ft) Plenum rated (Teflon jacket) M 91 m (300 ft) Plenum rated (Teflon jacket) N  Approvals	230 °C (446 °F) (400 to 1200 mm		Z	P1C
6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket C 30 m (100 ft) PVC Jacket D 46 m (150 ft) PVC Jacket E 61 m (200 ft) PVC Jacket F 91 m (300 ft) PVC Jacket G 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) J 30 m (100 ft) Plenum rated (Teflon jacket) K 46 m (150 ft) Plenum rated (Teflon jacket) L 61 m (200 ft) Plenum rated (Teflon jacket) M 91 m (300 ft) Plenum rated (Teflon jacket) N Approvals	Sensor cables (pair)			
61 m (200 ft) PVC Jacket 91 m (300 ft) PVC Jacket G 6 m (20 ft) Plenum rated (Teflon jacket) 15 m (50 ft) Plenum rated (Teflon jacket) 30 m (100 ft) Plenum rated (Teflon jacket) K 46 m (150 ft) Plenum rated (Teflon jacket) 61 m (200 ft) Plenum rated (Teflon jacket) 91 m (300 ft) Plenum rated (Teflon jacket) N Approvals	6 m (20 ft) PVC Jacket 15 m (50 ft) PVC Jacket		B C	
15 m (50 ft) Plenum rated (Teflon jacket) 30 m (100 ft) Plenum rated (Teflon jacket) K 46 m (150 ft) Plenum rated (Teflon jacket) 61 m (200 ft) Plenum rated (Teflon jacket) 91 m (300 ft) Plenum rated (Teflon jacket) N Approvals	61 m (200 ft) PVC Jacket		F	
61 m (200 ft) Plenum rated (Teflon jacket) 91 m (300 ft) Plenum rated (Teflon jacket)  Approvals	15 m (50 ft) Plenum rated (Teflon jacket)		J	
	61 m (200 ft) Plenum rated (Teflon jacket)		M	
UL, UL <sub>C</sub> , CE, C-TiCK	Approvals	-		
	UL, UL <sub>C</sub> , CE, C-TiCK		C	

Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-0MS40 (1012BN-4)

<sup>&</sup>lt;sup>2)</sup> Made of stainless steel construction.

# Flow Measurement SITRANS F US Clamp-on

# SITRANS FST020 (Basic)

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable termination kit (for one cable pair)  • Sensor cable termination for standard and plenum cable	T01
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
<ul><li>2SS40 pipe</li><li>3CS40 pipe</li><li>4CS40 pipe</li><li>4SS40 pipe</li></ul>	D01 D02 D03 D04
<ul><li>6CS40 pipe</li><li>6SS40 pipe</li><li>6CS120 pipe</li><li>8CS40 pipe</li></ul>	D05 D06 D07 D08
<ul><li>8SS40 pipe</li><li>8CS120 pipe</li><li>10CS Standard pipe</li><li>10CS40 pipe</li></ul>	D09 D10 D11 D12
<ul><li>10SS40 pipe</li><li>12CS Standard pipe</li><li>12CS40 pipe</li><li>14CS30 pipe</li></ul>	D13 D14 D15 D16
<ul><li>14CS40 pipe</li><li>16CS Standard pipe</li><li>16CS40 pipe</li><li>18CS Standard pipe</li></ul>	D17 D18 D19 D20
<ul><li>20CS20 pipe</li><li>20CS30 pipe</li><li>24CS Standard pipe</li><li>24CS20 pipe</li></ul>	D21 D22 D23 D24
<ul> <li>24CS30 pipe</li> <li>30CS Standard pipe</li> <li>36CS Standard pipe</li> <li>Other pipe, other liquid, additional points, witness</li> </ul>	D25 D26 D27 Y28
Tag name plate • Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

# MLFB example

#### Application example

A basic clamp-on meter is required for a DN 150 (6" schedule 40) carbon steel waste water line, with a pipe wall thickness of 7.1 mm (0.28"). Meter electronics are to be located in an instrumentation shed with available AC power. 36 m (120 ft) of sensor cable is needed to reach pipe location.

MLFB Article No.: 7ME3570-1HA30-0NE0

Selection and Ordering data	Article No. Ord. code
SITRANS FST020 meter family	7 M E 3 5 7 3 0 - 0 0 0
IP65 (NEMA 4X) enclosure	0
Single channel	1
Standard I/O option	н
100 240 V AC power option	A
Sensor code for channel 1	N
46 m (150 ft) sensor cable	E

Selection and Ordering data	Order code	
Operating Instructions for SITRANS FST020		
English NEMA 4X	A5E03086487	
German NEMA 4X	A5E03086488	

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

#### Universal sensor selection chart IP68

Based on pipe size (pipes other than steel)					
Pipe size	Order Code	Outer diameter range (mm)		Outer diameter range (inch)	
		min.	max.	min.	max.
A2	В	12.7	50.8	0.5	2
B3	С	19	127	0.75	5
C3 <sup>1)</sup>	D	51	305	2	12
D3 <sup>1)</sup>	E	203	610	8	24
E2 <sup>1)</sup>	F	254	6096	10	249

#### High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)						
Pipe Wall	Order	Pipe Wall [mm]		Pipe Wall [inch]		
	Code	min.	max.	min.	max.	
A1H	G	0.64	1.02	0.025	0.04	
A2H	н	1.02	1.52	0.04	0.06	
АЗН	J	1.52	2.03	0.06	0.08	
B1H	K	2.03	3.05	0.08	0.12	
B2H	L	3.05	4.06	0.12	0.16	
C1H <sup>1)</sup>	M	4.06	5.84	0.16	0.23	
C2H <sup>1)</sup>	N	5.84	8.13	0.23	0.32	
D1H <sup>1)</sup>	P	8.13	11.18	0.32	0.44	
D2H <sup>1)</sup>	Q	11.18	15.75	0.44	0.62	
D4H <sup>1)</sup>	R	15.75	31.75	0.62	1.25	

<sup>1)</sup> Made of stainless steel construction.

SITRANS F US Clamp-on

#### SITRANS FUP1010 (Portable)

#### Overview



SITRANS FUP1010 clamp-on non-intrusive ultrasonic flow transmitter offers maximum versatility plus battery power for portable field use. It can operate in either WideBeam transit time or reflexor (Doppler) mode, making it suitable for virtually any liquid, even those with high aeration or suspended solids.

SITRANS FUP1010 is available in single and dual channel or dual path configurations, with IP67 weatherproof enclosure.

#### Benefits

- Battery power facilitates field use; the meter is easily transported from one installation to another – saving time for surveys, monitoring and temporary installations
- Weatherproof enclosure can be used outdoors and left in place without concern for rain damage
- Rugged plastic case enables it to withstand rough treatment that would destroy most other meters
- Versatility there is no need to change meters when operating conditions change
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to wear or foul
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single or dual channel models minimizes total cost
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow
- Note that the SITRANS FUP1010 flow transmitter is not available with hazardous area approvals

# Application

SITRANS FUP1010 is suitable for a wide variety of liquid applications, including the following:

- · Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot and cold water systems
  - Thermal energy rate and total
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

#### Design

- IP67 Weatherproof/Impact resistant enclosure constructed of mineral reinforced copolymer polypropylene
- Single channel
- Dual channel/dual path

## Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options
- VT100 RS 232 communications

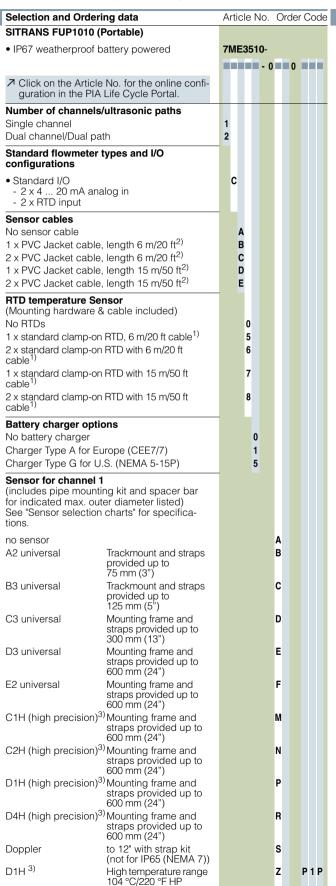
SITRANS FUP1010 (Portable)

Technical specifications	
Input	
Flow range	$\pm$ 12 m/s ( $\pm$ 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s ( 0.001 ft/s), flow rate independent
Pipe size	6.4 mm 9.14 m (0.25" 360")
Inputs, single channel	<ul> <li>Current: 20 mA DC</li> <li>Temperature: 4 wire 1 kΩ RTD</li> </ul>
Output	·
Outputs	<ul> <li>Current: 20 mA DC (1 kΩ at 30 V DC)</li> <li>Voltage: 10 V DC (5 kΩ minimum)</li> <li>Status Alarm: SPDT Relays</li> <li>Pulse rate: 5 kHz</li> <li>VT100 RS 232</li> </ul>
Accuracy	
Accuracy	$\pm0.5~\%$ 2 % of flow, for velocities greater than 0.3 m/s (1 ft/s) $\pm0.0015$ 0.006 m/s ( $\pm0.005$ 0.02 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	$\pm0.15$ % of flow, for velocities greater than 0.3 m/s (1 ft/s) $\pm0.0005$ m/s ( $\pm0.0015$ ft/s), for velocities less than 0.3 m/s (1 ft/s)
Rated operation conditions	
Degree of protection	
Weatherproof/impact resistant	IP67
Liquid temperature	
• Standard	-40 +120 °C (-40 +250 °F)
Optional	-40 +230 °C (-40 +450 °F)
Ambient temperature	-18 +60 °C (0 140 °F)
Design Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply Power	Internal rechargeable battery
Battery operation	7 hours
Indication and operation	7 Hours
Data logger memory	1 MByte
Site storage memory	50 sites minimum
Display	128 x 240 pixel LCD with backlight
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
Unclassified locations	UL ULc
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

SITRANS F US Clamp-on

### **SITRANS FUP1010 (Portable)**

## Standard MLFB for quick delivery on SITRANS FUP1010 Portable (excluding energy)



<u> </u>					
Selection and Orderi	ng data	Article No.	Orde	r Code	
SITRANS FUP1010 (	Portable)				
<ul> <li>IP67 weatherproof b</li> </ul>	attery powered	7ME3510-			
		- 0	0		
Sensor for channel 2 (includes pipe mounti for indicated max. out See "Sensor selection tions.	ng kit and spacer bar er diameter listed)		I		
no sensor			Α		
A2 universal	Trackmount and straps provided up to 75 mm (3")		В		
B3 universal	Trackmount and straps provided up to 125 mm (5")		С		
C3 universal	Mounting frame and straps provided up to 300 mm (13")		D		
D3 universal	Mounting frame and straps provided up to 600 mm (24")		E	Ш	
E2 universal	Mounting frame and straps provided up to 600 mm (24")		F	Ш	
C1H (high precision) <sup>3</sup>	Mounting frame and straps provided up to 600 mm (24")		М	Ш	
C2H (high precision) <sup>3</sup>	Mounting frame and straps provided up to 600 mm (24")		N	Ш	
D1H (high precision) <sup>3</sup>	straps provided up to 600 mm (24")		P		
D2H (high precision) <sup>3</sup>	Mounting frame and straps provided up to 600 mm (24")		Q	Ш	
Doppler	to 12" with strap kit (not for IP65 (NEMA 7))		S		
D1H <sup>3)</sup>	High temperature range 104 °C/220 °F HP		Z	Q 1 P	

Approvals: No options (UL, ULc, CE by default)

Standard MLFB product offering represents 4 to 6 weeks delivery time

<sup>1) -40 ... +200 °</sup>C (-40 ... +392 °F)

<sup>&</sup>lt;sup>2)</sup> -40 ... +80 °C (-40 ... +176 °F)

<sup>3)</sup> Made of stainless steel constructions.

## SITRANS FUP1010 (Portable)

Selection and Ordering data	Article No.	Ord. code	Selection and Or		Article No.	Ord	d. c	ode
SITRANS FUP1010 (Portable)	<b>-145</b> 0540		SITRANS FUP101	` ,	71150540			
IP67 weatherproof battery powered	7ME3510-		IP67 weatherpro	oof battery powered	7ME3510-			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		0		unting tracks for sizes A & B	- 0		U =	
Number of channels/ultrasonic paths Single channel Dual channel/Dual path	1 2		125 mm (5") and m for sizes C, D & E s	or pipe with a OD less than nounting frame/spacer bars sensors. Straps provided are naximum OD listed below.				
Standard flowmeter types and I/O configurations		ш	Strap kits are availa pipes (refer to spar Selection Charts" fo	able to accommodate larger re part list). Refer to "Sensor or the sensor suitability of				
<ul> <li>Standard I/O</li> <li>Reflexor capable</li> </ul>	С		pipe size and wall	thickness.				
- Graphic display - 2 x 0 10 V - 2 x 4 20 mA - 2 x pulse outputs		Ш	no sensor A2 universal	Trackmount and straps provided up to 75 mm (3")		A B		
- 4 x status logic - 2 x 4 20 mA analog in - 1 x RTD per channel		ш	B3 universal	Trackmount and straps provided up to 125 mm (5")		С		
Sensor cables (select proper quantity of active channels)			C3 universal	Mounting frame and straps provided up to 300 mm (13")		D		
No sensor cable  IP67 (weatherproof) only	Α		D3 universal	Mounting frame and straps provided up to 600 mm (24")		E		
1 x PVC-jacket, length 6 m (20 ft) (for IP67 NEMA 6) <sup>2)</sup> 2 x PVC-jacket, length 6 m (20 ft)	В		E2 universal	Mounting frame and straps provided up to 600 mm (24")		F		
(for IP67 NEMA 6) <sup>27</sup> 1 x PVC-jacket, length 15 m (50 ft) (for IP67 NEMA 6) <sup>2)</sup>	D		perature range is -					
2 x PVC-jacket, length 15 m (50 ft) (for IP67 NEMA 6) <sup>2)</sup>	E			nominal 21 °C (70 °F): on) Trackmount and straps provided up to		н		
RTD temperature sensor (for type 3 meter only, mounting hardware and cable included)		ш	A3H (high precision	provided up to		J		
No RTDs IP67 (weatherproof) only 1 x standard clamp-on RTD (NEMA 6) with	0	ш	B1H (high precision	provided up to		К		
6 m (20 ft) cable <sup>1)</sup> 2 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable <sup>1)</sup>	5 6	ш	B2H (high precision	125 mm (5") on) Trackmount and straps provided up to 125 mm (5)		L		
1 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable 1)	7	ш	C1H (high precision	on) <sup>3)</sup> Mounting frame and straps provided up to 600 mm (24")		М		
2 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable 1) Battery charger options	_ 8		C2H (high precision	on) <sup>3)</sup> Mounting frame and straps provided up to		N		
no battery charger Charger Type A for Europe (CEE7/7)	0 1		D1H (high precision	600 mm (24") on) <sup>3)</sup> Mounting frame and straps provided up to 600 mm (24")		Р		
Charger Type C for Australia (AS3112) Charger Type D for U.K. (BS1363) Charger Type J for Japan (JIS8303)	2 3 4	ш	D2H (high precision	on) <sup>3)</sup> Mounting frame and straps provided up to 600 mm (24")		Q		
Charger Type G for U.S. (NEMA 5-15P) Charger Type L for Switzerland (SEV1011)	5 6		D4H (high precision	on) <sup>3)</sup> Mounting frame and straps provided up to 600 mm (24")		R		
				°F) (30 to 200 mm diam.		s z	P	) 1 A
				sensor size 3 for °F) (150 to 610 mm diam.		z	P	1 B
			(5.90 to 24 inch di High temperature up to 230 °C (446 (15.75 to 47.25 inc	sensor size 4 for °F) (400 to 1200 mm diam.		z	P	1 C

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## SITRANS FUP1010 (Portable)

Selection and Order	ing data	Article No.	Orc	l. code
SITRANS FUP1010 (		Alticle INO.	Oic	i. coue
IP67 weatherproof by	•	7ME3510-		
ii or modulorproor k	and y powered	- 0	0	
Sensor for channel	(continued)			
For the following B1H perature range is -1 °	to D4H sensors, tem- C up to 104 °C nominal 65 °C (150 °F): e range HP)		Z Z	P 1 K P 1 L
C1H (high temperatur	0 ,		Z	P 1 M
C2H (high temperatur	0 ,		Z Z	P1N P1P
D1H (high temperature D2H (high temperature D2H)	• ,		Z	P1P
D4H (high temperatur	0 ,		z	P1R
indicated max. outer d	ng kit and spacer bar for iameter listed) charts" for specifica-			
no sensor			Α	
A2 universal	Trackmount and straps provided up to 75 mm (3")		В	
B3 universal	Trackmount and straps provided up to 125 mm (5")		С	
C3 universal	Mounting frame and straps provided up to 300 mm (13")		D	
D3 universal	Mounting frame and straps provided up to 600 mm (24")		E	
E2 universal	Mounting frame and straps provided up to 600 mm (24")		F	
For the following A2H temperature range is (-41 °F 150 °F), nor A2H (high precision)	to D4H sensors, -40 °C 65 °C minal 21 °C (70 °F):		H	
AZH (High precision)	provided up to 75 mm (3")		П	
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		J	
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		K	
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L	
C1H (high precision) <sup>6</sup>	Mounting frame and straps provided up to 600 mm (24")		M	
C2H (high precision) <sup>6</sup>			N	
D1H (high precision) <sup>2</sup>	Mounting frame and straps provided up to 600 mm (24")		P	
D2H (high precision) <sup>2</sup>	Mounting frame and straps provided up to 600 mm (24")		Q	
D4H (high precision) <sup>2</sup>	Mounting frame and straps provided up to 600 mm (24")		R	
Doppler	to 12" with chain kit		s	

Selection and Ordering data	Article No.	Ord	. code
SITRANS FUP1010 (Portable)			
<ul> <li>IP67 weatherproof battery powered</li> </ul>	7ME3510-		
	- 0	0	
Sensor for channel 2 (continued)			
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))		Z	Q1A
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))		Z	Q 1 B
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))		Z	Q1C
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F): B1H (high temperature range HP) B2H (high temperature range HP) C1H (high temperature range HP) C2H (high temperature range HP) D1H (high temperature range HP) D2H (high temperature range HP) D4H (high temperature range HP)		Z Z Z Z Z Z	Q1K Q1L Q1M Q1N Q1P Q1Q

Approvals: No options (UL, ULc, CE by default)

<sup>3)</sup> Made of stainless steel constructions.

Selection and Ordering data	Article No.		
Operating Instructions for SITRANS FUP1010			
English IP67 Weatherproof	A5E02951522		
German IP67 Weatherproof	A5E02951534		
This device is shipped with a Quick Start Guide and a CD containing			

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

<sup>1) -40 ... +200 °</sup>C (-40 ... +392 °F)

<sup>&</sup>lt;sup>2)</sup> -40 ... +80 °C (-40 ... +176 °F)

## **SITRANS FUP1010 (Portable)**

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Languages (Meter and Documentation), English (default). All languages now come standard in all flow-meters	
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
<ul> <li>2SS40 pipe</li> <li>3CS40 pipe</li> <li>4CS40 pipe</li> <li>4SS40 pipe</li> <li>6CS40 pipe</li> <li>6SS40 pipe</li> <li>6CS120 pipe</li> </ul>	D01 D02 D03 D04 D05 D06 D07
<ul><li>8CS40 pipe</li><li>8SS40 pipe</li><li>8CS120 pipe</li><li>10CS Standard pipe</li><li>10CS40 pipe</li></ul>	D08 D09 D10 D11 D12
<ul><li>10SS40 pipe</li><li>12CS Standard pipe</li><li>12CS40 pipe</li><li>14CS30 pipe</li></ul>	D13 D14 D15 D16
<ul><li>14CS40 pipe</li><li>16CS Standard pipe</li><li>16CS40 pipe</li><li>18CS Standard pipe</li></ul>	D17 D18 D19 D20
<ul><li>20CS20 pipe</li><li>20CS30 pipe</li><li>24CS Standard pipe</li><li>24CS20 pipe</li></ul>	D21 D22 D23 D24
<ul> <li>24CS30 pipe</li> <li>30CS Standard pipe</li> <li>36CS Standard pipe</li> <li>Other pipe, other liquid, additional points, witness</li> </ul>	D25 D26 D27 Y28
1x Insertion RTD with thermowell and lagging 2x Insertion RTD with thermowell and lagging	M1A M1B
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

## MLFB example

## Application example

A general survey portable flowmeter is required for pipes sizes ranging from 76 ... 500 mm (3" ... 20") with both cast iron and steel material. Doppler may be required as liquid may be moderately aerated.

Requires language support for German.

MLFB Article No.: 7ME3510-2CB01-0DE0-Z

B10

Selection and Ordering data	Article No. Ord. code
SITRANS FUP1010 meter family	7 ME 3 5 1 0 - 0
IP67 weatherproof	0
Dual channel	2
Portable I/O with Doppler capable, temperature	С
1 x PVC-Jacket, length 6 m (20 ft)	В
No RTDs required	0
Charger Type A for Europe (CEE7/7)	1
Sensor for DN 50 DN 300 (2" 12") pipes	D
Sensor for DN 200 DN 600 (8" 24") pipes	E

## Universal sensor selection chart IP68

Based on pipe size (all pipe materials)					
Pipe size	Order Code	Outer diameter range (mm)		Outer dia range (in	
		min.	max.	min.	max.
A2	В	12.7	50.8	0.5	2
B3	С	19	127	0.75	5
C3	D	51	305	2	12
D3	E	203	610	8	24
E2	F	254	6096	10	249

## High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Pipe Wall	Order	Pipe Wal	l [mm]	Pipe Wal	l [inch]
	Code	min.	max.	min.	max.
A1H	G	0.64	1.02	0.025	0.04
A2H	Н	1.02	1.52	0.04	0.06
АЗН	J	1.52	2.03	0.06	0.08
B1H	K	2.03	3.05	0.08	0.12
B2H	L	3.05	4.06	0.12	0.16
C1H <sup>1)</sup>	M	4.06	5.84	0.16	0.23
C2H <sup>1)</sup>	N	5.84	8.13	0.23	0.32
D1H <sup>1)</sup>	Р	8.13	11.18	0.32	0.44
D2H <sup>1)</sup>	Q	11.18	15.75	0.44	0.62
D4H <sup>1)</sup>	R	15.75	31.75	0.62	1.25

<sup>1)</sup> Made of stainless steel constructions.

SITRANS F US Clamp-on

## SITRANS FUP1010 Water and Liquid check metering kits

#### Overview



There are two check kits available: SITRANS FUP1010 Water check metering kit for water and wastewater applications, and SITRANS FUP1010 Liquid check metering kit for liquid applications other than water. The kits have been developed especially for verifying the accuracy and performance of any brand or type of flowmeter. They can be used to verify the performance of meters based on any existing flow measurement principle: orifice, electromagnetic, ultrasonic, rotary piston, coriolis, etc. In addition, they measure practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids.

## Benefits

- Performance check or verification of any type or brand of flowmeter
- Field use is facilitated by meter portability and 7 hours or normal battery operation.
- Weatherproof enclosure withstands even severe weather conditions
- 1 MByte datalogger capability downloadable to PC via included RS 232 cable
- Fast, easy and cost-efficient on-site measurement of any convoluted pipe from 20 to 1200 mm (0.75 to 48")
- Delivered as an all inclusive kit in a sturdy rolling case that holds all the equipment needed to conduct performance and verification tests (cables, multiple sensors, flow transmitter etc.)

## Application

The SITRANS FUP1010 Water and Liquid Check Metering Kits measure practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. This basic feature enables the performance check and verification of existing meters used in various water and wastewater applications such as:

Raw Water and sewage

- Potable water
- Chemicals
- Effluent and sludges
- · Process control
- Batching
- Rate indication
- · Hot and cold water systems

#### Design

- IP67 weatherproof/impact resistant enclosure, constructed of mineral reinforced copolymer polypropylene
- Single channel

#### Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see Technical specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

#### Technical specifications

Pipe sizes	
<ul> <li>Water Check Metering Kit</li> </ul>	50 1050 mm (2 42")
<ul> <li>Liquid Check Metering Kit</li> </ul>	20 1200 mm (0.75 48")
Accuracy	±0.5 % ±2.0 % of flow rate
Flow range	12 m/s (40 ft/s) bidirectional
Media temperature	-40 +104 °C (-40 220 °F)
Enclosure ratings	IP67 (Weatherproof)

See page 3/343 for complete technical specifications

## Cerificates and approvals

Unclassified locations

UL ULc

Classified locations

CE

EMV Directive 2004/108/EC ATEX Directive 94/9/EC

3/348

## SITRANS FUP1010 Water and Liquid check metering kits

Select	ion and Ordering data	Article No.
SITRA	NS FUP1010 Water Check Metering Kit	CQO:FUPW-WWKIT
Conte	nt of delivery	
1	Single channel portable submersible flow transmitter	
1 pair	Universal sensor C3 <sup>1)</sup>	
1 pair	Universal sensor E2 <sup>1)</sup>	
1 pair	Doppler sensors	
1 pair	Mounting Ezclamp (2 mounting Ezclamp chains)	
1	Ladder chain	
1	Battery charger	
1 pair	20 ft sensor cable	
1	Cable - 1010WP/WDP to PC	
1	PinStop spacer bar (universal)	
1	Flow case	
1	Flowmeter manual	
1	Laminated card set	
1	Certificate of intrinsic calibration	

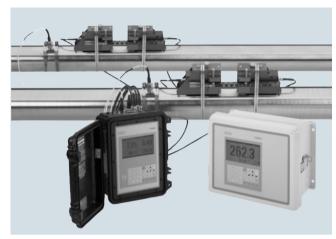
Select	ion and Ordering data	Article No.
SITRA	NS FUP1010 Liquid Check Metering Kit	CQO:FUS-LIQKIT
Conte	nt of delivery	
1	Single channel portable submersible transmitter	
1 pair	Universal sensor B3	
1 pair	Universal sensor C3 <sup>1)</sup>	
	Universal sensor D3 <sup>1)</sup>	
1 pair	Universal sensor E2 <sup>1)</sup>	
1 pair	Doppler sensors	
1 pair	Sensor cables 6m (20 ft)	
1 pair	Mounting track	
1 pair	Mounting Ezclamp	
1	Spacer bar (portable)	
1	Ladder chain	
1	Battery charger	
1	RS 232 cable for PC connection	
1	Flow case	
1	Clamp-on flowmeter manual CD	
1	Flowmeter manual	
1	Laminated card set	
1	Certificate of intrinsic calibration	

<sup>1)</sup> Made of stainless steel constructions.

SITRANS F US Clamp-on

#### SITRANS FUE1010 (Energy)

#### Overview



SITRANS FUE1010 is a highly accurate clamp-on non-intrusive ultrasonic flow transmitter for revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems.

SITRANS FUE1010 is available in single and dual channel or dual path configurations, with your choice of IP65 (NEMA 4X) dedicated wall mount or IP40 (NEMA 1) portable enclosures.

#### Benefits

- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- · No moving parts to foul or wear
- · No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single or dual channel/dual path or dual mode operation:
  - Dual channel operation reduces the cost for the system on a per channel measurement basis and permits measuring hot and chilled water lines at the same time
  - Dual path capability insures high flow measurement accuracy on installations with less than desirable piping runs
- Ability to operate in either Wide-Beam Transit-time or reflexor (Doppler) mode for applications with high aeration
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

## Application

SITRANS FUE1010 is ideally suited to thermal energy/power industry applications, including:

- Chilled water sub-metering
- Hot water sub-metering
- Condenser water
- Glycol
- · Thermal storage
- · Lake source cooling

## Design

SITRANS FUE1010 is available in three configurations:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single channel
  - Dual channel/dual path
- IP40 (NEMA 1) Portable impact resistant enclosure constructed of mineral reinforced copolymer polypropylene
  - Dual channel/dual path

#### Function

- Flow transmitter has an integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000  $\Omega$  platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)
- Temperature is factory calibrated with built-in field calibrator.
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Reverse flow and empty pipe detection
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
  - Cooling load (kW/ton)
  - Coefficient of performance (COP)
  - Energy efficiency ratio (EER)
- · Optional current inputs
- Digital communication options:
  - HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)
  - VT100 RS 232 serial communications (Portable and NEMA 4X)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

## SITRANS FUE1010 (Energy)

Flow range	Technical specifications	
bi-directional	Input	
Pipe size   6.4 mm 9.14 m (0.25" 360")     Current: 20 mA     Temperature: 4 wire 1 kΩ RTD     Totalizer commands (clear/hold)     Output     Standard outputs     Current: 20 mA DC (1 kΩ at 30 V DC)     Voltage: 10 V DC (5 kΩ minimum)     Status Alarm: SPDT Relays     Form C relays     Pulse rate: 5 kHz     VT100 RS 232     Expanded I/Os (4 additional 4 20 mA outputs) with form C relays     HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)     Accuracy	Flow range	
Current: 20 mA	Flow sensitivity	0.0003 m/s (0.001 ft/s)
Temperature: 4 wire 1 kΩ RTD     Totalizer commands (clear/hold)  Output  Standard outputs      Current: 20 mA DC (1 kΩ at 30 V DC)     Voltage: 10 V DC (5 kΩ minimum)     Status Alarm: SPDT Relays     Form C relays     Pulse rate: 5 kHz     VT100 RS 232  Optional outputs  Optional outputs  Optional outputs  Parameter MSTP/BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  + 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)     ± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)     ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)     ± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)     ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)     ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)     ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Example of protection  Wall mount enclosure: IP65 (NEMA 4X)     Portable enclosure: IP65 (NEMA 4X)     Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  -40 +120 °C (-40 +250 °F)  -40 +230 °C (-40 +250 °F)  Sensor temperature  • Standard  -40 +120 °C (-40 +250 °F)  Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  Weight  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	Pipe size	6.4 mm 9.14 m (0.25" 360")
	Inputs per channel	Current: 20 mA
Output         • Current: 20 mA DC (1 kΩ at 30 V DC)           • Voltage: 10 V DC (5 kΩ minimum)         • Status Alarm: SPDT Relays           • Form C relays         • Pulse rate: 5 kHz           • VT100 RS 232         • Expanded I/Os (4 additional 4 20 mA outputs) with form C relays           • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)           Accuracy         ± 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s); ± 0.0015 0.01 ft/s), for velocities greater than 0.3 m/s (1 ft/s)           Batch repeatability         ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)           ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)           • Do005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)         ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s           • 1 ft/s)		·
Current: 20 mA DC (1 kΩ at 30 V DC)	<del></del>	Iotalizer commands (clear/hold)
(1 kΩ at 30 V DC)  • Voltage: 10 V DC (5 kΩ minimum)  • Status Alarm: SPDT Relays  • Form C relays  • Pulse rate: 5 kHz  • VT100 RS 232  Optional outputs  • Expanded I/Os (4 additional 4 20 mA outputs) with form C relays  • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  * 40.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s))  Batch repeatability  * ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) should be considered by the	•	a Course at 200 as A DC
(5 kΩ minimum)  • Status Alarm: SPDT Relays  • Form C relays  • Pulse rate: 5 kHz  • VT100 RS 232  Optional outputs  • Expanded I/Os (4 additional 4 20 mA outputs) with form C relays  • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  ★ 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.0015 0.001 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ★ 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  Batch repeatability  ★ 0.15 % of flow, for velocities less than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  Fated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  ★ 0 +120 °C (-40 +250 °F)  • Optional  ★ 0 +230 °C (-40 +450 °F)  Sensor temperature  • Standard  ★ 0 +230 °C (-40 +450 °F)  Ambient temperature  • Standard  ★ 0 +232 °C (-80 +450 °F)  Ambient temperature  • Standard  ★ 0 +232 °C (-80 +450 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide" see diagrams  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	Staridard outputs	
Status Alarm: SPDT Relays     Form C relays     Pulse rate: 5 kHz     VT100 RS 232  Optional outputs      Expanded I/Os (4 additional 4 20 mA outputs) with form C relays     HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  Accuracy      ± 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s) ± 0.0005 (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Eated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  -40 +120 °C (-40 +250 °F)  • Optional  -40 +230 °C (-40 +250 °F)  • Optional  -40 +232 °C (-80 +450 °F)  Ambient temperature  • Standard  -40 +232 °C (-80 +450 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide" see diagrams  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
		,
Pulse rate: 5 kHz  • VT100 RS 232  • Expanded I/Os (4 additional 4 20 mA outputs) with form C relays  • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  ★ 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities greater than 0.3 m/s (1 ft/s) ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.005 0.01 ft/s), for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Rated operation conditions  Degree of protection  Wall mount enclosure: IP40 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  -40 +120 °C (-40 +250 °F)  • Optional  -40 +230 °C (-40 +450 °F)  Sensor temperature  • Standard  -40 +232 °C (-80 +450 °F)  Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide" see diagrams  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		•
Optional outputs  • Expanded I/Os (4 additional 4 20 mA outputs) with form C relays • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)  Accuracy  Accuracy  • ± 0.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Batch repeatability  • ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s), for velocities greater than 0.3 m/s (1 ft/s), for velocities less than 0.3 m/s (1 ft/s))  Rated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  • 40 +120 °C (-40 +250 °F)  • Optional  • 40 +230 °C (-40 +450 °F)  Sensor temperature  • Standard  • 40 +232 °C (-80 +450 °F)  Ambient temperature  18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide" Weight  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		· ·
## Accuracy  ## Ac		• VT100 RS 232
Page 1	Optional outputs	
IP, Johnson N2 (IP65, NEMA 4X only)		HART, BACnet MSTP/BACnet IP,
Accuracy  Accuracy  \$\frac{\text{\$\delta} \text{ \$\delta} \tex		
## 1.5 % 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.015 % of flow, for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 2.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (± 0.0015 ft/s), for velo		
for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Batch repeatability  ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Rated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  -40 +120 °C (-40 +250 °F)  -40 +230 °C (-40 +450 °F)  Sensor temperature  • Standard  -40 +120 °C (-40 +450 °F)  Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  weight  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	Accuracy	
(1 ft/s) ± 0.0015 0.003 m/s (± 0.005 0.011 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Batch repeatability ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ### 20.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  #### 20.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ###################################	Accuracy	
(± 0.005 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Batch repeatability  ± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  Rated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  • Optional  -40 +120 °C (-40 +250 °F)  Sensor temperature  • Standard  -40 +120 °C (-40 +450 °F)  Sensor temperature  • Standard  -40 +120 °C (-40 +250 °F)  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  weight  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
for velocities less than 0.3 m/s (1 ft/s)  Batch repeatability  \$\frac{\text{total flow, for velocities greater than 0.3 m/s}}{\text{total flow, for velocities greater than 0.3 m/s}}} \text{total than 0.3 m/s} \text{total flow, for velocities greater than 0.3 m/s}} \text{total flow, for velocities less than 0.3 m/s}} \text{total flow, for velocities greater than 0.3 m/s} \text{total flow, for velocities less than 0.3 m/s} total flow, for velocities less than 0.3 m/s flow, for velocities less than 0.3 m/s flow, for velocities less		
## Batch repeatability  ## 10.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)   ## 10.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 10.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities greater than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)  ## 12.0005 m/s (± 0.0015 f		for velocities less than 0.3 m/s
for velocities greater than 0.3 m/s	Detala van estala liitu	` '
# 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)    Rated operation conditions	Batch repeatability	
for velocities less than 0.3 m/s (1 ft/s)  Rated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  • Standard  -40 +120 °C (-40 +250 °F)  -40 +230 °C (-40 +450 °F)  Sensor temperature  • Standard  -40 +120 °C (-40 +250 °F)  -40 +232 °C (-40 +450 °F)  Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  weight  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
Rated operation conditions  Degree of protection  Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)  Liquid temperature  Standard  Optional  Sensor temperature  Standard  Optional  Optional  Optional  Optional  Optional  Standard  Optional  Opti		for velocities less than 0.3 m/s
Degree of protection         Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)           Liquid temperature         • Standard         -40 +120 °C (-40 +250 °F)           • Optional         -40 +230 °C (-40 +450 °F)           Sensor temperature         • Standard         -40 +120 °C (-40 +250 °F)           • Optional         -40 +232 °C (-80 +450 °F)           Ambient temperature         -18 +60 °C (0 140 °F)           Design           Dimensions         see SITRANS F US Clamp-on "System info and selection guide" see diagrams           Power supply           Dedicated         90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		(1 ft/s)
IP65 (NEMA 4X)	•	NA/-II on a contact and a contact and a
IP40 (NEMA 1)   Liquid temperature   Standard	Degree of protection	
Liquid temperature  ● Standard  -40 +120 °C (-40 +250 °F)  ● Optional  -40 +230 °C (-40 +450 °F)  Sensor temperature  ● Standard  -40 +120 °C (-40 +250 °F)  ● Optional  -40 +232 °C (-40 +250 °F)  Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  Weight  See diagrams  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
• Standard  • Optional  • Optional  • Optional  • Optional  • Standard  • Standard  • Standard  • Optional  • A0 +120 °C (-40 +250 °F)  • Optional  • A0 +232 °C (-80 +450 °F)  Ambient temperature  • Standard  • A0 +120 °C (-40 +250 °F)  • Optional  • Optional  • A0 +232 °C (-80 +450 °F)  Ambient temperature  • Standard  • Optional  • Optional  • See SITRANS F US Clamp-on  "System info and selection guide"  Weight  • See diagrams  Power supply  Dedicated  • Optional  • Opti	Liquid temperature	11 TO (14L141/11)
<ul> <li>Optional         <ul> <li>-40 +230 °C (-40 +450 °F)</li> </ul> </li> <li>Sensor temperature         <ul> <li>Standard</li> <li>-40 +120 °C (-40 +250 °F)</li> </ul> </li> <li>Optional         <ul> <li>-40 +232 °C (-80 +450 °F)</li> </ul> </li> <li>Ambient temperature         <ul> <li>-18 +60 °C (0 140 °F)</li> </ul> </li> <li>Design         <ul> <li>Dimensions</li> <li>see SITRANS F US Clamp-on "System info and selection guide"</li> <li>see diagrams</li> </ul> </li> <li>Power supply</li> <li>Dedicated</li> <li>90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC</li> </ul>		-40 +120 °C (-40 +250 °F)
Sensor temperature         • Standard       -40 +120 °C (-40 +250 °F)         • Optional       -40 +232 °C (-80 +450 °F)         Ambient temperature       -18 +60 °C (0 140 °F)         Design       see SITRANS F US Clamp-on "System info and selection guide"         Weight       see diagrams         Power supply       90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
• Standard  • Optional  • Optional  -40 +120 °C (-40 +250 °F)  -40 +232 °C (-80 +450 °F)  Ambient temperature  -18 +60 °C (0 140 °F)   Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  Weight  see diagrams  Power supply  Dedicated  90 240 ∨ AC, 50 60 Hz, 30 ∨A or 9 36 ∨ DC	·	
Optional	·	-40 +120 °C (-40 +250 °F)
Ambient temperature  -18 +60 °C (0 140 °F)  Design  Dimensions  see SITRANS F US Clamp-on "System info and selection guide"  Weight  see diagrams  Power supply  Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
Design Dimensions  see SITRANS F US Clamp-on "System info and selection guide" Weight  see diagrams  Power supply Dedicated  90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	·	· ·
"System info and selection guide" Weight see diagrams  Power supply Dedicated 90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	·	, ,
Weight see diagrams  Power supply  Dedicated 90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	•	see SITRANS F US Clamp-on
Power supply  Dedicated 90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC		
Dedicated 90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC	Weight	see diagrams
30 VA or 9 36 V DC	• • •	
9 36 V DC	Dedicated	
Portable enclosure Rechargeable battery		
	Portable enclosure	Rechargeable battery

Indication and operation	
Data logger memory	1 Mbyte of storage
Display	128 x 240 pixel LCD with backlight
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian French
Certificates and approvals	
Dedicated enclosures	
FM and CSA ratings	Transmitter NI Class I, Div 2 S Class II, Div 2 Sensor
	I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
Portable enclosures	UL ULc
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

SITRANS F US Clamp-on

## SITRANS FUE1010 (Energy)

## Standard MLFB for quick delivery on SITRANS FUE1010 (Energy system)

Salastian and Ord	orina data	Article No.	Order code
Selection and Order SITRANS FUE1010	<u> </u>	7 M E 3 5 0 0	Order code
	cle No. for the online configuration in the PIA Life Cycle Portal.	7 W L 3 3 0 0	
	ble No. for the orinine configuration in the FIA Life Cycle Fortal.		
<b>Design</b> Dedicated			
IP65 (NEMA 4X) wa	ull mount	0	K02 + K02 + R02
Portable			
IP40 (NEMA 1) Batt	ery powered	2	K01 + K01 + R01
	ls/ultrasonic paths		
Dedicated meters			
Single channel Portable meters		1	
Dual channel/Dual	oath	4	
· ·	ns and I/O configurations	-	
Portable Standard	· · · · · · · · · · · · · · · · · · ·	С	
- Reflexor capabi			
<ul> <li>Graphic display</li> <li>2 x 0 10 V</li> </ul>			
- 2 x 4 20 mA			
- 2 x pulse output			
<ul> <li>4 x status logic</li> <li>Energy efficienc</li> </ul>	y COP/EER output		
- 2 x 4 20 mA a	nalog input		
Dedicated Standa		F	
<ul> <li>Reflexor capabi</li> <li>Graphic display</li> </ul>			
- 2 x 0 10 V			
- 2 x 4 20 mA			
<ul> <li>2 x pulse output</li> <li>4 x relay C type</li> </ul>			
<ul> <li>Energy efficience</li> </ul>	y COP/EER output		
- 2 x 4 20 mA a	<u> </u>		
Meter power optio			
90 240 V AC (De Charger Type A for	* ·	A C	
Charger Type K for		G	
No charger	5.5. (IVEIVING 161)	Ĵ	
Communication o	otions	_	
VT100 RS 232		0	
RTD temperature s	sensor pair		
	hardware for pipes above 1.5" outer diameter)		
	nperature input is required for Energy systems) on RTD (NEMA 4X only) <sup>3)</sup>	0 1	
	on RTD (Neiwa 47 only) 7 on RTD (For Dual Channel NEMA 4X only) <sup>3)</sup>	2	
	on RTD (For NEMA 12 Portable) <sup>3)</sup>	3	
2 x Pair Std clamp-	on RTD (For Dual Channel NEMA 1 Portable)3)	4	
	ith Thermowell and Lagging <sup>3)</sup>	9	M 1 A
2 x Insertion RTD w	ith Thermowell and Lagging <sup>3)</sup>	9	M 1 B
Sensor for channe			
See "Sensor selecti	nting kit and spacer bar for indicated max. OD listed) on charts" for specifications.		
no sensor	•	,	
A2 universal	Trackmount and straps provided up to 75 mm (3")	E	
B3 universal	Trackmount and straps provided up to 125 mm (5")		
C3 universal <sup>5)</sup> D3 universal <sup>5)</sup>	Mounting frame and straps provided up to 300 mm (13")  Mounting frame and straps provided up to 600 mm (24")		
E2 universal <sup>5)</sup>	Mounting frame and straps provided up to 600 mm (24)  Mounting frame and straps provided up to 1200 mm (48") <sup>1)4)</sup>	E	
	Mounting frame and straps provided up to 1200 mm (44) Mounting frame and straps provided up to 600 mm (24") <sup>4</sup>	,	
C1H (high precision) <sup>5)</sup>			
C2H (high precision) <sup>5)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>	ı	
D1H (high preci-	Mounting frame and straps provided up to 1200 mm (48") <sup>4)</sup>	F	
sion) <sup>5)</sup>			
D2H (high precision) <sup>5)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>4)</sup>		
Doppler	to 12" with strap kit (not for IP65 (NEMA7)),		
	for up to 121 °C (250 °F)		
D1H <sup>5)</sup>	High temperature range 104 °C/220 °F HP <sup>2)</sup>		P1P

## SITRANS FUE1010 (Energy)

Selection and Ord	dering data	Article No.	Order code	
SITRANS FUE101	0 (Energy)	7 M E 3 5 0	- 0 + -	+
See "Sensor select	el 2 unting kit and spacer bar for indicated max. OD listed) tion charts' for specifications.			
no sensor A2 universal B3 universal C3 universal <sup>5)</sup> D3 universal <sup>5)</sup> E2 universal <sup>5)</sup> C1H (high precision) <sup>5)</sup> C2H (high preci	Trackmount and straps provided up to 75 mm (3") Trackmount and straps provided up to 125 mm (5") Mounting frame and straps provided up to 300 mm (13") Mounting frame and straps provided up to 600 mm (24") Mounting frame and straps provided up to 1200 mm (48") <sup>1)4)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>		A B C D E F M	
sion) <sup>5)</sup> D1H (high precision) <sup>5)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>4)</sup>		P	
D4H (high precision) <sup>5)</sup> Doppler D1H <sup>5)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>4)</sup> to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F) High temperature range 104 °C/220 °F HP <sup>2)</sup>		R S Z Q1P	
Approvals	UL/Portable FM, CSA, CE, Dedicated		0	

Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

Standard MLFB product offering represents 4 to 6 weeks delivery time

For sensor and RTD cables for quick delivery see tables at end of section

<sup>(1012</sup>BN-4)

2) Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

3) Requires two R\*\* cables per one RTD pair

4) 600 mm (24\*) for portable systems only

5) Made with stainless steel constructions.

SITRANS F US Clamp-on

## SITRANS FUE1010 (Energy)

Selection and Ordering data	Article No.	Ord. code	Selection and Order	ing data
SITRANS FUE1010 (Energy)			SITRANS FUE1010 (	Energy)
Dedicated     IP65 (NEMA 4X) wall mount	7ME3500-		<ul> <li>Dedicated IP65 (NEMA 4X) wa</li> </ul>	ıll mount
Portable IP40 (NEMA 1) Battery powered	7ME3502-		<ul> <li>Portable IP40 (NEMA 1) Batt</li> </ul>	ery powered
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	- 0		RTD temperature se (includes mounting ha	
Number of channels/ultrasonic paths Dedicated meter			<ol> <li>1.5" outer diameter)</li> <li>No RTDs (Note: temp</li> </ol>	erature input is
Dedicated meter Single channel Dual channel/Dual path	1 2		for energy system) 1 x pair standard clar (NEMA 4X only) <sup>3)</sup>	•
Portables Dual channel/Dual path	4		2 x pair standard clar (for dual channel NEI 1 x pair standard clar	MA 4X only) <sup>3)</sup>
Flowmeter functions and I/O configura-			(NEMA 1 Portable) <sup>3)</sup> 2 x pair standard clar	mp-on RTD
Portable Standard I/O Reflexor capability Graphic display 2 x 0 10 V 2 x 4 20 mA	С		(for dual channel NEI 1 x Insertion style RTI lagging <sup>3)</sup> 2 x Insertion style RTI lagging <sup>3)</sup>	D with thermow
- 2 x 4 20 mA - 2 x pulse output - 4 x status logic - Energy efficiency COP/EER output - 2 x 4 20 mA analog input			Sensor for channel Including pipe mount A & B sensors indent less than 125 mm (5" frame/spacer bars for	ing tracks for s ed for pipe with and mounting
Dedicated Standard I/O     Reflexor capability     Graphic display     2 x 0 10 V     2 x 4 20 mA     2 x pulse output	F		Straps provided are f mum OD listed below to accommodate larg part list). Refer to "Se for the sensor suitabil thickness.	or the indicated or Strap kits are per pipes (refer nsor Selection
<ul><li>4 x relay C type</li><li>Energy efficiency COP/EER output</li></ul>			No sensor	
<ul> <li>2 x 4 20 mA analog input</li> <li>Extended output adder plus standard inputs (4 additional 4 20 mA outputs) and form C relay</li> </ul>	z	J 1 B	A2 universal B3 universal	Trackmount ar provided up to 75 mm (3") Trackmount ar
Meter power options				provided up to 125 mm (5")
90 240 V AC (Dedicated only) 9 36 V DC (Dedicated only)	A B		C3 universal <sup>5)</sup>	Mounting fram straps provide 300 mm (13")
Charger Type A for Europe (CEE7/7) Charger Type C for Australia (AS3112) Charger Type D for U.K. (BS1363)	C D E		D3 universal <sup>5)</sup>	Mounting fram straps provide 600 mm (24")
Charger Type D for Japan (JIS8303)  Charger Type K for U.S. (NEMA 5-15P)  Charger Type L for Switzerland (SEV1011)	F G H		E2 universal <sup>5)</sup>	Mounting fram straps provide 1200 mm (48"
No Charger External 4 hours battery with US plug for Por-	J Z	K 1 A	For the following A1H temperature range is (-41 °F 150 °F), not	-40 °C 65 °C
table  External 4 hours battery with European plug	z	K 1 B	For other temperature spare parts list.	e ranges please
for Portable		KIB	A2H (high precision)	Trackmount ar
Communication options VT100 RS 232 7ME3500 only;	0 3		A3H (high precision)	75 mm (3") Trackmount ar provided up to 75 mm (3")
HART, BACnet MSTP/BACnet IP, Modbus RTU/TCPIP, Ethernet IP, Johnson N2			B1H (high precision)	75 mm (3") Trackmount ar provided up to 125 mm (5")

Selection and Order	ing data	Article	No.	Ord	. code
SITRANS FUE1010 (					
<ul> <li>Dedicated IP65 (NEMA 4X) wa</li> </ul>	ıll mount	7ME3	500-		
<ul> <li>Portable IP40 (NEMA 1) Batt</li> </ul>	ery powered	7ME3	502-		
			- 0		
RTD temperature se (includes mounting had 1.5" outer diameter)	ensor ardware for pipes above				
,	erature input is required		0		
1 x pair standard clar (NEMA 4X only) <sup>3)</sup>	mp-on RTD		1		
2 x pair standard clar (for dual channel NEI	MA 4X only) <sup>3)</sup>		2		
1 x pair standard clar (NEMA 1 Portable) <sup>3)</sup>	mp-on RTD		3		
2 x pair standard clar (for dual channel NEI	mp-on RTD MA 1 Portable) <sup>3)</sup>		4		
1 x Insertion style RTI lagging <sup>3)</sup>	D with thermowell and		9		M 1 A
2 x Insertion style RTI lagging <sup>3)</sup>	D with thermowell and		9		M1B
less than 125 mm (5" frame/spacer bars for Straps provided are fmum OD listed below to accommodate larg part list). Refer to "Se	ed for pipe with a OD				
No sensor				Α	
A2 universal	Trackmount and straps provided up to 75 mm (3")			В	
B3 universal	Trackmount and straps provided up to 125 mm (5")			С	
C3 universal <sup>5)</sup>	Mounting frame and straps provided up to 300 mm (13")			D	
D3 universal <sup>5)</sup>	Mounting frame and straps provided up to			E	
E2 universal <sup>5)</sup>	600 mm (24") E2 universal <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>1)4)</sup>				
For the following A1H temperature range is (-41 °F 150 °F), no					
For other temperature spare parts list.	e ranges please see				
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")			Н	
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")			J	
B1H (high precision)					

## SITRANS FUE1010 (Energy)

SITRANS FUETUTU (Energ						ergy)		
Selection and Or		Article No. Ord. code Selection and Ordering data				Article No.	Ord	. code
SITRANS FUE101	10 (Energy)	SITRANS FUE1010 (Energy)						
<ul> <li>Dedicated IP65 (NEMA 4X)</li> </ul>	wall mount	7ME3500-			<ul> <li>Dedicated IP65 (NEMA 4X) wall mount</li> </ul>	7ME3500-		
<ul> <li>Portable IP40 (NEMA 1) E</li> </ul>	Rattery nowered	7ME3502-			<ul> <li>Portable IP40 (NEMA 1) Battery powered</li> </ul>	7ME3502-		
11 40 (142141/11)	battery powered	- 0			ii 40 (ively) in Battery powered	- 0		
Sensor for chann	nel 1 (continued)				Sensor for channel 2 (continued)		-	
	on) Trackmount and straps provided up to		L		For the following A1H to D4H sensors, temperature range is -40 °C 65 °C			
C1H (high precision	125 mm (5") on) <sup>5)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>	ı	M		(-41 °F 150 °F), nominal 21 °C (70 °F): A2H (high precision) Trackmount and straps provided up to		Н	
C2H (high precision	on) <sup>5)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>		N		75 mm (3")  A3H (high precision) Trackmount and straps provided up to		J	
D1H (high precision	on) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		Р		75 mm (3")  B1H (high precision) Trackmount and straps provided up to 125 mm (5")		K	
	on) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		Q		B2H (high precision) Trackmount and straps provided up to 125 mm (5")		L	
D4H (high precision	on) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		R		C1H (high precision) <sup>5)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>		M	
Doppler	to 12" with strap kit, for up to 121 °C (250 °F)		S		C2H (high precision) <sup>5)</sup> Mounting frame and straps provided up to 600 mm (24") <sup>4)</sup>		N	
	sensor size 2 for up to 30 200 mm diam. diam.))		Z	P 1 A	D1H (high precision) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		P	
	sensor size 3 for up to 50 610 mm diam.		Z	P 1 B	D2H (high precision) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		Q	
High temperature 230 °C (446 °F) (4	sensor size 4 for up to 100 1200 mm diam.		Z	P 1 C	D4H (high precision) <sup>5)</sup> Mounting frame and straps provided up to 1200 mm (48") <sup>2)4)</sup>		R	
	cn diam.)) 31H to D4H sensors, e is -1 °C up to 104 °C				Doppler to 12" with strap kit, for up to 121 °C (250 °F)		S	
	F), nominaľ 65 °C (150 °F): ature range HP)		Z Z	P1K P1L	High temperature sensor size 2 for up to 230 °C (446 °F) (30 200 mm diam. (1.18 7.67 inch diam.))		Z	Q1A
C1H (high temper C2H (high temper	ature range HP) <sup>5)</sup> ature range HP) <sup>5)</sup>		Z Z	P1M P1N	High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam.		Z	Q 1 B
D2H (high temper	ature range HP) <sup>2)5)</sup> ature range HP) <sup>2)5)</sup> ature range HP) <sup>2)5)</sup>		Z Z Z	P1P P1Q P1R	(5.90 to 24 inch diam.))  High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam.		z	Q 1 C
Sensor for chann					(15.75 to 47.25 inch diam.))  For the following B1H to D4H sensors,			
	ed) See "Sensor selection				temperature range is -1 °C up to 104 °C (30 °F up 220 °F), nominal 65 °C (150 °F):			
no sensor			A		B1H (high temperature range HP)		Z	Q1K
A2 universal	Trackmount and straps provided up to		В		B2H (high temperature range HP) C1H (high temperature range HP) <sup>5)</sup>		Z Z	Q1L Q1M
B3 universal	75 mm (3") Trackmount and straps provided up to		С		C2H (high temperature range HP) <sup>5)</sup> D1H (high temperature range HP) <sup>2)5)</sup> D2H (high temperature range HP) <sup>2)5)</sup>		Z Z Z	Q1N Q1P Q1Q
C3 universal	125 mm (5")  Mounting frame and straps provided up to		D		D4H (high temperature range HP) <sup>2)5)</sup> Approvals		Z	Q1R
D3 universal	300 mm (13")  Mounting frame and straps provided up to		E		FM/CSA/CE Dedicated UL/ULc/CE Portable		1 0	
E2 universal	600 mm (24")  Mounting frame and straps provided up to		F		<ol> <li>Supplied spacer bar supports pipes up to 1050 larger than 1050 mm (42 inch) purchase also, sp 7ME3960-0MS40 (1012BN-4).</li> </ol>	mm (42 inch). pare part	For	pipes
	1200 mm (48") <sup>1)4)</sup>				Supplied spacer bar supports pipes up to 750 n larger than 750 mm (30 inch) purchase also, spa		or p	ipes

<sup>7</sup>ME3960-0MS40 (1012BN-4).

<sup>2)</sup> Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

 $<sup>^{3)}</sup>$  Requires two R\*\* cables per one RTD pair

 $<sup>^{4)}</sup>$  600 mm (24") for portable systems only

<sup>&</sup>lt;sup>5)</sup> Made with stainless steel construction.

SITRANS F US Clamp-on

## SITRANS FUE1010 (Energy)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of channels) See "Sensor cable selection chart"	K
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	R
Cable termination kit (for one cable pair) dedicated only	
Termination for standard, plenum and armored sensor cable	T01
Termination for submersible sensor cable	T11
<ul> <li>RTD cable termination kit for standard RTD</li> <li>RTD cable termination kit for submersible RTD</li> <li>Insert RTD cable termination kit</li> <li>Cable gland kit</li> </ul>	T21 T31 T41 T51
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
<ul><li>2SS40 pipe</li><li>3CS40 pipe</li><li>4CS40 pipe</li><li>4SS40 pipe</li></ul>	D01 D02 D03 D04
<ul><li>6CS40 pipe</li><li>6SS40 pipe</li><li>6CS120 pipe</li><li>8CS40 pipe</li></ul>	D05 D06 D07 D08
<ul><li>8SS40 pipe</li><li>8CS120 pipe</li><li>10CS Standard pipe</li><li>10CS40 pipe</li></ul>	D09 D10 D11 D12
<ul><li>10SS40 pipe</li><li>12CS Standard pipe</li><li>12CS40 pipe</li><li>14CS30 pipe</li></ul>	D13 D14 D15 D16
<ul><li>14CS40 pipe</li><li>16CS Standard pipe</li><li>16CS40 pipe</li><li>18CS Standard pipe</li></ul>	D17 D18 D19 D20
<ul><li>20CS20 pipe</li><li>20CS30 pipe</li><li>24CS Standard pipe</li><li>24CS20 pipe</li></ul>	D21 D22 D23 D24
<ul> <li>24CS30 pipe</li> <li>30CS Standard pipe</li> <li>36CS Standard pipe</li> <li>Other pipe, other liquid, additional points, witness</li> </ul>	D25 D26 D27 Y28
Tag name plate  Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

## MLFB example

## Application example

A dedicated clamp-on energy meter is required for two separate return lines. Both will use clamp-on RTDs for the supply and return lines. AC power is available and data access will be via Modbus communication.

Pipe 1 is a DN150 (6") schedule 40 carbon steel line Pipe 2 is a DN 300 (12") ductile iron line

MLFB Article No.: **7ME3500-2FA30-2NE0-Z** 

K03 + K05 + R03 + R05 + R02 + R03

Selection and Ordering data	Article No. Ord. code
SITRANS FUE1010 meter family	7 ME 3 5 0 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -
IP65 (NEMA 4X) enclosure	0
Dual channel	2
Dedicated Type 1 I/O option	F
90 230 V AC power option	A
Modbus option	3
2 pairs of clamp-on RTDs	2
Sensor code for 6" pipe	N
Sensor code for 12" pipe	E
No approval required	0
30 m (100 ft) sensor cable for channel 1	К 0 3
61 m (200 ft) sensor cable for channel 1	K 0 5
30 m (100 ft) cable for RTD 1	R 0 3
61 m (200 ft) cable for RTD 2	R 0 5
15 m (50 ft) cable for RTD 3	R 0 2
30 m (100 ft) cable for RTD 4	R 0 3

Selection and Ordering data	Order code
Operating Instructions for SITRANS FUE1010	
English NEMA 4X Wall mount	A5E03086491
German NEMA 4X Wall mount	A5E03086492
English IP40 NEMA 1 Battery powered	A5E02951524
German IP40 NEMA 1 Battery powered	A5E02951536

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

SITRANS F US Clamp-on

## SITRANS FUE1010 (Energy)

## Universal sensor selection chart IP68

Based on pipe size (all pipe materials)							
Pipe size	Order Code	Outer dia range (m		Outer diameter range (inch)			
		min.	max.	min.	max.		
A2	В	12.7	50.8	0.5	2		
B3	С	19	127	0.75	5		
C3	D	51	305	2	12		
D3	E	203	610	8	24		
E2	F	254	6096	10	249		

## High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)						
Pipe Wall	Order	Pipe Wall [mm]		Pipe Wall [inch]		
	Code	min.	max.	min.	max.	
A1H	G	0.64	1.02	0.025	0.04	
A2H	Н	1.02	1.52	0.04	0.06	
АЗН	J	1.52	2.03	0.06	0.08	
B1H	K	2.03	3.05	0.08	0.12	
B2H	L	3.05	4.06	0.12	0.16	
C1H <sup>1)</sup>	M	4.06	5.84	0.16	0.23	
C2H <sup>1)</sup>	N	5.84	8.13	0.23	0.32	
D1H <sup>1)</sup>	Р	8.13	11.18	0.32	0.44	
D2H <sup>1)</sup>	Q	11.18	15.75	0.44	0.62	
D4H <sup>1)</sup>	R	15.75	31.75	0.62	1.25	

<sup>1)</sup> Made with stainless steel construction.

## Sensor cable (single pair) selection chart

Sensor cable codes for length and type options						
Cable length m (ft)	Standard (PVC jacket) -40+80 °C (-40+176 °F)	Submersible <sup>1)</sup> (polyethylene jacket) -40+80 °C (-40+176 °F)	Plenum Rated (teflon jacket) -40+200 °C (-40+392 °F)	Armored <sup>1)</sup> -40+80 °C (-40+176 °F)		
	Order code					
6 (20)	<b>K01</b> <sup>2)</sup>	K11	K21	K31		
15 (50)	K02	<b>K12</b> <sup>2)</sup>	K22	<b>K32</b> <sup>2)</sup>		
30 (100)	<b>K03</b> <sup>2)</sup>	<b>K13</b> <sup>2)</sup>	K23	K33		
46 (150)	<b>K04</b> <sup>2)</sup>	K14	K24	K34		
61 (200)	K05	K15	K25	K35		
91 (300)	<b>K06</b> <sup>2)</sup>	K16	K26	K36		

<sup>1)</sup> Submersible and armored sensor cable is not available for portable ver-

## RTD cable (single) selection chart

RTD cable codes for length and type				
Cable length m (ft)	Standard (teflon wrapped) -40 +200 °C (-40 +392 °F)	Insert <sup>1)</sup> -40 +200 °C (-40 +392 °F)		
	Order code			
6 (20)	R01 <sup>2)</sup>	R21		
15 (50)	<b>R02</b> <sup>2)</sup>	R22		
30 (100)	<b>R03</b> <sup>2)</sup>	R23		
46 (150)	R04	R24		
61 (200)	R05	R25		
91 (300)	R06	R26		

Submersible RTD cable is not available for portable versions.
 Standard MLFB for quick delivery

sions.

2) Standard MLFB for quick delivery

SITRANS F US Clamp-on

## SITRANS FUE1010 (HVAC) Check metering kit

#### Overview



The SITRANS FUE1010 dual channel clamp-on check metering kit is an all inclusive HVAC chilled water kit developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The meter's portability makes it capable of verifying the performance of meters based on any existing flow measurement principle: electromagnetic, vortex, insertion turbine, or ultrasonic. Perfect for areas where no metering exists. Ideal for balancing building performance. It accurately computes flow over an extremely wide range and measures practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. Dual channel models can measure two separate applications at the same time.

#### Benefits

- Performance check or verification of any type or brand of flowmeter
- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Field use is facilitated by meter portability charge for 4 hours of normal operation
- 1 MByte datalogger capability downloadable to PC via included RS 232 cable
- Performs fast, easy and cost-efficient on-site measurement of any convoluted pipe from 25.4 mm to 9.14 m (1.0" to 360")
- Delivered as an all inclusive kit with all the equipment needed to conduct performance and verification tests (cables, multiple sensors, flow transmitter etc.)
- Comes in a sturdy rolling case with a telescope handle that holds all the equipment needed to conduct performance and verification tests.

## Application

The SITRANS FUE1010 Check Metering Kit is a highly accurate clamp-on non-intrusive ultrasonic flow display transmitter or revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems. This kit is ideal for applications which include:

- · Chilled water sub-metering
- Condenser water
- Potable water
- Ammonia and glycol
- · River and lake water
- · Lake source cooling

## Design

- IP40 (NEMA 1) Impact resistant enclosure, constructed of flame retardant ABS with polycarbonate display and polyester keypad
- Dual channel/dual path

#### Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000  $\Omega$  platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
  - Cooling load (kW/ton)
  - Coefficient of performance (COP)
  - Energy efficiency ratio (EER)
- Temperature is factory calibrated with built-in field calibrator
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- · ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

## SITRANS FUE1010 (HVAC) Check metering kit

## Technical specifications

 Pipe sizes
 25.4 mm ... 9.14 m (1 ... 360")

 Accuracy
 ± 0.5 % ... ± 2.0 % of flow rate

 Flow range
 12 m/s (40 ft/s) bidirectional

 Media temperature
 -40 ... +104 °C (-40 ... 220 °F)

 Enclosure ratings
 IP40 (NEMA 1) impact resistant

See page 3/351 for complete technical specifications

## Cerificates and approvals

Portable enclosures
Unclassified locations

UL ULc

Classified locations

CE

EMC Directive 2004/108/EC ATEX Directive 94/9/EC

Selecti	on and Ordering data	Article No.
Energy	check metering kit	CQO:FUEHVACKIT
Conten	t of delivery	
1	Dual channel portable submersible flow transmitter	
1 pair	Universal sensors C3 <sup>1)</sup>	
1 pair	Doppler sensors	
	High precision sensors C2 <sup>1)</sup>	
1 pair	High precision sensors D1 <sup>1)</sup>	
2 pairs	RTDs	
2 pairs	Mounting Ezclamp (4 mounting Ezclamp chains)	
1	Battery charger	
2 pairs	6 m (20 ft) sensor cables	
1	RS 232 cable	
4	RTD cable 6 m (20 ft)	
4	Mountings for RTDs	
1	Spacer bar (Portable)	
2	F connector to BNC	
1	Flow case	
1	Flow meter manual	
1	Laminated card set	
1	Certificate of intrinsic calibration	

<sup>1)</sup> Made with stainless steel construction.

SITRANS F US Clamp-on

#### SITRANS FUH1010 (Oil)

#### Overview



SITRANS FUH1010 clamp-on non-intrusive ultrasonic flowmeter is ideal for applications carrying crude oil, refined petroleum or liquefied gas.

SITRANS FUH1010 has three application areas: Interface detectors, precision volume or standard volume flowmeters.

#### Benefits

## For all SITRANS FUH1010 products

- · Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio, 30:1
- Choice of single, dual, or optional, three or four path versions.
  - Single path version reduces initial investment
  - Two or optional three and four path versions provide higher accuracy, especially where limited straight run or poor flow profile exists
- WideBeam technology
  - Helps provide improved accuracy over a wide range of liquid conditions and flow rates
  - Accommodates pipelines transporting multiple liquid products
- ZeroMatic Path automatically corrects for zero drift without stopping flow

#### Interface detection

- Outputs liquid density and API as a direct replacement for intrusive densitometers
- Exceptional repeatability is maintained, independent of changes in temperature, pressure or viscosity
- No need for straight run

#### Precision volume

- Moderate cost
- Precise measurement is maintained with automatic "Reynolds Number" compensation for temperature and viscosity changes.

## Standard volume

- Exceptional repeatability is maintained, independent of changes in temperature, density or viscosity
- · Batch interface and product quality diagnostics provided
- · Density and API outputs provided
- · Scraper ("pig") detection provided

## Application

#### Interface detection

- Precise identification of interfaces on multi-liquid pipelines
- · Product identification
- · Density indication

#### Precision volume

- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity changes

#### Standard volume

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Interface detection
- "Pig" detection
- Chemical and petrochemical processing

### Design

SITRANS FUH1010 is available in three enclosures:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single path
  - Dual path
- Optional four path
- IP65 (NEMA 7) compact explosion proof enclosure constructed of cast aluminum with glass window, stainless steel hardware
- Single path
- Dual path (option)
- IP66 (NEMA 7) wall mount explosion proof enclosure constructed of cast aluminum, stainless steel hardware, with glass window
  - Single path
  - Dual path
- Four path (optional)
- There are 2 types of mounting assemblies
  - Aluminum mounting frames (default)
  - Stainless steel weld seal (optional)

## Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flowmeters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact explosion proof flow meter has a 2 x 16 alpha-numeric LCD display
- Current, voltage, status alarm, frequency outputs and communications HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232 (see specification section for details)
- Analog inputs (see specification section for details)
- ZeroMatic Path automatically corrects for zero drift
- Bidirectional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

## SITRANS FUH1010 (Oil)

Accuracy	
•	
Accuracy	± 0.05 of API No.
Repeatability	± 0.01 of API No.

Specifications for volumetric and	mass flowmeters
Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Accuracy	
Typical accuracy	± 0.5 to 1 % of flow
Calibratable accuracy	$\pm~0.15~\%~\dots~0.3~\%$ of flow, depending on version
Batch repeatability	$\pm0.05$ % of flow, maximum

Specifications for all SITDANS	EIIH1010 products
Specifications for all SITRANS	FUHIUIU products
Input	
Pipe size	6.4 mm 9.14 m (0.25" 360")
Analog inputs	<ul> <li>Current: 4 x 4 20 mA (IP65 (NEMA 7) enclosure has (2))</li> </ul>
Output	
Standard outputs	• Current: 20 mA (1 kΩ at 30 VDC)
	<ul> <li>Voltage: 10 V DC (5 kΩ minimum) (None for IP65 (NEMA 7) enclosure)</li> </ul>
	<ul> <li>Pulse Rate: 5 kHz, Digital Quad (None for IP65 (NEMA7))</li> </ul>
	• VT100 RS 232
Extended outputs	<ul> <li>HART, BACnet MSTP/BACnet IF Modbus RTU &amp; TCP/IP, Ethernet IP, Johnson N2</li> </ul>
	<ul><li>4 x 4 20 mA (not for IP65 (NEMA 7) enclosure)</li></ul>
	<ul> <li>Form C relays (not for IP65 (NEMA 7) enclosure)</li> </ul>
	<ul> <li>Digital pulse (not for IP65 (NEMA 7) enclosure)</li> </ul>

• Programmable relays (not for IP65 (NEMA 7) enclo-

 Totalizer clear switch input (not for IP65 (NEMA 4X) enclosure)<sup>1)</sup>

• Totalizer hold switch input (not for IP65 (NEMA 7) enclosure)<sup>1)</sup>

 Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclosure, only)<sup>1)</sup>

 Opto iso. totalizer hold switch input (for IP65 (NEMA 7) enclosure, only)<sup>1)</sup>

 Optically coupled output logic gates (for IP65 (NEMA 7) enclosure, only)

Status/Alarm I/O	
Status/Alarm I/O	

Accuracy	
Zero Drift	0.0003 m/s (0.001 ft/s), with ZeroMatic Path active (not provided for interface detec- tor)
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	
Wall mount	IP65 (NEMA 4X)
<ul> <li>Compact explosionproof</li> </ul>	IP65 (NEMA 7)
<ul> <li>Wall mount explosionproof</li> </ul>	IP66 (NEMA 7)
Liquid temperature	
Standard	-40 +120 °C (-40 +250 °F)
Optional	-40 +230 °C (-40 +450 °F)
Ambient temperature	-18 +60 °C (0 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
<ul> <li>IP65 (NEMA 4X) wall mount and IP66 (NEMA 7) wall mount explo- sionproof</li> </ul>	90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC, 12 W
IP65 (NEMA 7) compact explo- sionproof	90 240 V AC, 50 60 Hz, 15 VA or 9 36 V DC, 10 W
Indication and operation	
Data logger memory	1 MByte
Display	
<ul> <li>IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures</li> </ul>	128 x 240 pixel LCD with back- light
• IP65 (NEMA 7) Enclosure	2 x 16 Alphanumeric LCD Display
Keypad	
<ul> <li>IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures</li> </ul>	33 keypad buttons with tactile feedback
• IP65 (NEMA 7) Enclosure	5 Magnetic hall effect switches
Language options	English, Spanish, German, Italian, French

<sup>1)</sup> Totalizer switch inputs are not provided for the interface detector.

SITRANS F US Clamp-on

## SITRANS FUH1010 (Oil)

SITRANS FUH1010 (Oil)	
Certificates and approvals	
IP65 (NEMA 4X) wall mount enclosure	
FM and CSA	Transmitter
	N-I Class I, Div 2 S Class II, Div 2
	Sensor
CE	• I.S. Class I, II, Div 1  EMC Directive 2004/108/EC
OL .	ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC EX II 3 (1) G Ex nC [ia] IIC T5
	• Sensors: Ex II 1 G Ex ia IIC T5
IP65 (NEMA 7) compact explosion- proof enclosure ratings	
FM and CSA	Tranmitter
	XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 Sensor
	• I.S. Class I, II, Div 1
CE	<ul><li>EMC Directive 2004/108/EC</li><li>ATEX Directive 94/9/EC</li></ul>
C-TICK	
ATEX	• Transmitter: Ex II 2 (1) G Ex d [ia] IIB + H2 T5
	• Sensors: Ex II 1 G Ex ia IIC T5
IP66 (NEMA 7) wall mount explosionproof enclosure ratings	
FM and CSA	Transmitter
	XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2
	Sensor
CE	I.S. Class I, II, Div 1  EMC Directive 2004/108/EC  ATEX Directive 94/9/EC
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB + H2 T5
	• Concoro

• Sensors: Ex II 1 G Ex ia IIC T5

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SITRANS FUH1010 (Oil)

## Standard MLFB for quick delivery on SITRANS FUH1010 (Oil)

Selection and Ordering	Nata	Article No.	Order code
SITRANS FUH1010 (Oil)	Jata	7ME 3 6 0 0 - 0 -	
` ′	for the online configuration in the PIA Life Cycle Portal.		
Design	<u> </u>		
IP65 (NEMA 4X) wall mou	nt	0	
Number of ultrasonic pa	ths/meter type		
Dual path Standard Volum	ne	4	
Flowmeter functions and includes graphic or digital wall mount explosionproof	l display, IP66 (BNB6665 (NEMA 4X)) and IP66 (NEMA 7)		
Standard • Graphic display • 4 x 4 20 mA analog in • 2 x 0 10 V • 2 x 4 20 mA • 2 x pulse outputs • 4 x form C relays • 2 x RTD input	put	А	
Meter power options			
90 240 V AC		A	
Communication options			
VT100 RS 232		0	
No RTDs  1 x standard clamp-on RT  2 x standard clamp-on RT  1 x submersible clamp-on  2 x submersible clamp-on  RTD  Notes:  1. Temperature input is red  2. Only the Interface deter	vare for pipes above 1.5"/38 mm OD)  D  RTD  RTD	0 1 2 3 4	
Sensor for channel 1 (includes pipe mounting k	tit and spacer bar for indicated max. outer diam. listed)		
no sensor C2H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 600 mm (24")	A N	
D1H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")	P	
D4H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")	R	
D1H (high precision) <sup>1)</sup>	High Temperature to 104 °C/220 °F	Z	P 1 P
Sensor for channel 2 (includes pipe mounting k See "Sensor selection cha	it and spacer bar for indicated max. OD listed) urts' for specifications.		
no sensor C2H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 600 mm (24")	A N	
D1H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")	P	
D4H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")	R	
D1H (high precision) <sup>1)</sup>	High Temperature to 104 °C/220 °F	Z	Q 1 P
Approvals			
FM/CSA/CE (default) ATEX, CE, C-TICK		1 2	
Standard MI ED product o	offering represents 4 to 6 weeks delivery time		

Standard MLFB product offering represents 4 to 6 weeks delivery time

For sensor and RTD cables for quick delivery see tables at end of section.

<sup>1)</sup> Made with stainless steel constuction.

SITRANS F US Clamp-on

## SITRANS FUH1010 (Oil)

Simale Femilian (Sil)						
Selection and Ordering data	Article No.	Ord. code	Selection and Orde	<u> </u>	Article No.	Ord. code
SITRANS FUH1010 (Oil)			SITRANS FUH1010	` ,		
<ul> <li>IP65 (NEMA 4X) wall mount</li> </ul>	7ME3600-		• IP65 (NEMA 4X) wa		7ME3600-	
<ul> <li>IP65 (NEMA 7) compact explosion proof</li> </ul>	7ME3601-		• IP65 (NEMA 7) cor	npact explosionproof	7ME3601-	
<ul> <li>IP66 (NEMA 7) wall mount explosionproof</li> </ul>	7ME3603-		<ul> <li>IP66 (NEMA 7) wal</li> </ul>	I mount explosionproof	7ME3603-	
	0 -				0 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				ensor pardware for pipes above		
Number of ultrasonic paths/meter type			1.5" OD)			
Single path (precision volume)	0		for SITRANS FUH sy	perature input is required stems)	0	
Single path (interface detector)	1		1 x Standard clamp-	on RTD	1	
Dual channel/Dual path (interface detector)  Dual path (precision volume)	2 3		2 x Standard clamp-		2	
Dual path (standard volume/mass)	4		1 x Submersible clar		3	
Special: Four path (standard volume/mass)	9	H1A	2 x Submersible clar	•	4	
only			Sensor for channel (includes standard p			
Flowmeter functions and I/O configura-			spacer bar for indica	ited max. outer diameter		
tions Includes graphic or digital display			listed) See "Sensor selection	n charts" for specifica-		
IP65 (NEMA 4X) wall mount and IP66 (NEMA			tions.	n charte for opcomed		
7 wall mount explosionsproof) units			no sensor		4	1
Standard	Α		For the following A1H	H to D4H sensors, tem-		
<ul><li>Graphic display</li><li>4 x 4 20 mA analog input</li></ul>			perature range is -40 (-41 °F to 150 °F), no	) °C to 65 °C		
- 2 x 0 10 V			, , , , , , , , , , , , , , , , , , , ,	Trackmount and straps	H	
<ul><li>2 x 4 20 mA analog output</li><li>2 x pulse output</li></ul>			/ IET ( ( g. ) prodiction )	provided up to	_	
- 4 x form C relay			A2H (high procision)	75 mm (3") Trackmount and straps		
- 2 x RTD input			A3H (High precision)	provided up to		'
• Extended I/O option	С			75 mm (3")		
- additional 2 x 4 20 mA outputs - Form C relays			B1H (high precision)	Trackmount and straps provided up to	,	(
- 4 x digital pulse outputs (2 x open collec-				125 mm (5")		
tor and 2 x 0 5 V TTL)			B2H (high precision)	Trackmount and straps	L	-
IP65 (NEMA 7) compact explosionproof units				provided up to 125 mm (5")		
<ul><li>Standard</li><li>Digital display</li></ul>	D		B3H (high precision)	Trackmount and straps	7	г
- 2 x 4 20 mÅ (Loop)				provided up to 125 mm (5")		
<ul><li>2 x 4 20 mA analog input</li><li>2 x status (open collector)</li></ul>			C1H (high preci-	Mounting frame and	N	1
- 1 x RTD input			sion) <sup>3)</sup>	straps provided up to 600 mm (24") <sup>1)</sup>		
Digital pulse option	F		C2H (high preci-	Mounting frame and	N	ı
<ul><li>1 x digital pulse open collector output</li><li>2 x 4 20 mA (Loop)</li></ul>			sion) <sup>3)</sup>	straps provided up to		
- 2 x 4 20 mA analog input			D1H (high preci-	600 mm (24") <sup>1)</sup> Mounting frame and		,
<ul><li>1 x status (open collector)</li><li>1 x RTD input</li></ul>			sion) <sup>3)</sup>	straps provided up to		
Meter power options			DOLL /Isia-i	1200 mm (48") <sup>1)</sup>		
• •			D2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to	C	
90 240 V AC 9 36 V DC (except compact NEMA 7)	A B		,	1200 mm (48") <sup>1)</sup>		
9 36 V DC (except compact NEWA 7)	J		D3H (high preci- sion) <sup>3)</sup>	Mounting frame and straps provided up to	U	J
9 36 V DC positive GND (compact only)	K		31011)	1200 mm (48") <sup>1)</sup>		
Communication options			D4H (high preci-	Mounting frame and	F	2
VT100 RS 232	0		sion) <sup>3)</sup>	straps provided up to 1200 mm (48") <sup>1)</sup>		
HART, BACnet MSTP/BACnet IP, Modbus RTU	2					
& TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232						

## SITRANS FUH1010 (Oil)

Selection and Order	ing data	Article No.	Ord	. code
SITRANS FUH1010	(Oil)			
• IP65 (NEMA 4X) wa	all mount	7ME3600-		
• IP65 (NEMA 7) com	pact explosionproof	7ME3601-		
• IP66 (NEMA 7) wall	mount explosionproof	7ME3603-		
		0 -		
perature range is -1 ° (30 °F up to 220 °F), B1H (high temperatu B2H (high temperatu B3H (high temperatu C1H (high temperatu C2H (high temperatu D1H (high temperatu	I to D4H sensors, tem- 'C up to 104 °C nominal 65 °C (150 °F): re range HP) re range HP) re range HP) <sup>3)</sup> re range HP) <sup>3)</sup> re range HP) <sup>3)</sup> re range HP) <sup>3)</sup>		Z Z Z Z Z Z	P1K P1L P1T P1M P1N P1P
D2H (high temperatu D3H (high temperatu D4H (high temperatu	re range HP) <sup>1)3)</sup>		Z Z Z	P1Q P1U P1R
for indicated max. ou	ing kit and spacer bar			
no sensor			Α	
perature range is -40 (-41 °F to 150 °F), no			н	
A3H (high precision)	75 mm (3") Trackmount and straps provided up to 75 mm (3")		J	
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		K	
, ,	Trackmount and straps provided up to 125 mm (5")		L	
B3H (high precision)	provided up to 125 mm (5")		T	
C1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>1)</sup>		M	
C2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>1)</sup>		N	
D1H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		P	
D2H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		Q	
D3H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		U	
D4H (high precision) <sup>3)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		R	

Selection and Ordering data	Article No.	Ord	. code
SITRANS FUH1010 (Oil)			
• IP65 (NEMA 4X) wall mount	7ME3600-		
• IP65 (NEMA 7) compact explosionproof	7ME3601-		
• IP66 (NEMA 7) wall mount explosionproof	7ME3603-		
	0 -	4	
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F): B1H (high temperature range HP) B2H (high temperature range HP) B3H (high temperature range HP) C1H (high temperature range HP)³) C2H (high temperature range HP)³) D1H (high temperature range HP)¹)3 D2H (high temperature range HP)¹)3 D3H (high temperature range HP)¹)3 D3H (high temperature range HP)¹)3 D4H (high temperature range HP)¹)3		Z Z Z Z Z Z Z Z Z	Q1K Q1L Q1T Q1M Q1N Q1P Q1Q
Approvals			
FM/CSA/CE/C-TICK (default), also for non hazardous area ATEX		1 2	

- Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).
- 2) Dual channel interface detector only
- 3) Made with stainless steel construction.

Selection and Ordering data	Order cod
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of paths) See "Sensor cable selection chart"	K
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	R
Cable termination kit (for one cable pair)	
Termination for standard, plenum and armored sensor cable	T01
<ul> <li>Termination for submersible cable</li> </ul>	T11
<ul> <li>RTD cable termination kit for standard RTD</li> </ul>	T21
RTD cable termination kit for submersible RTD	T31
Cable gland kit	T51
Languages (Meter and Documentation), English (default)	
German	B10
• French	B12
• Spanish	B13
• Italian	B14
Tag name plate	V/40
• Stainless steel tags with 3.2 mm (0.13 inch) characters (68 characters max.)	Y19

SITRANS F US Clamp-on

## **SITRANS FUH1010 (Oil)**

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUH1010	
English NEMA 4X & NEMA 7 wall mount Standard Volume	A5E02951449
German NEMA 4X & NEMA 7 wall mount Standard Volume	A5E02951529
English NEMA 4X & NEMA 7 wall mount explosionproof Precision Volume English NEMA 4X & NEMA 7	CQO:1010PVNFM-3 A5E02951504
wall mount explosionproof Interface Detector	
English NEMA 7 compact explosionproof Standard Volume	CQO:1010DVXFM-3
English NEMA 7 compact explosion proof Precision Volume	CQO:1010PVXFM-3
English NEMA 7 compact explosionproof Interface Detector	CQO:1010BXFM-3

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

## MLFB example

## Application example

A clamp-on meter is required for a 12" carbon steel hydrocarbon line flowing multiple products, with a wall thickness of 12.7 mm (0.5"). Meter electronics are to be located in a Class I Div 2 area only 60 ft from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement. Pulse output will be primary flow data source.

MLFB Article No.: **7ME3600-3CB00-3QQ1-Z K03 + K03 + R03** 

			_
Selection and Ordering data	Article No. Ord.	cod	е
SITRANS FUH1010 meter family	7 ME 3 6 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	П	
IP65 (NEMA 4X) enclosure	0		
Dual path precision volume	3		
Custody Transfer option with digital pulse	С		
9 36 V DC power option	В		
VT100 RS 232	0		
RTD required for viscosity comp	3		
Sensor code for path 1	Q		
Sensor code for path 2	Q		
FM approval required	1		
$30\mathrm{m}$ (100 ft) sensor cable for path 1		K 0	3
30 m (100 ft) sensor cable for path 2		K 0	3
30 m (100 ft) cable for RTD		R 0	3

## High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)						
Sensor	Order	Pipe wall (	Pipe wall (mm)		Pipe wall (inch)	
Pipe wall	Code	min.	max.	min.	max.	
A1H	G	0.64	1.02	0.025	0.04	
A2H	Н	1.02	1.52	0.04	0.06	
АЗН	J	1.52	2.03	0.06	0.08	
B1H	K	2.03	3.05	0.08	0.12	
В2Н	L	3.05	4.06	0.12	0.16	
C1H <sup>1)</sup>	М	4.06	5.84	0.16	0.23	
C2H <sup>1)</sup>	N	5.84	8.13	0.23	0.32	
D1H <sup>1)</sup>	Р	8.13	11.18	0.32	0.44	
D2H <sup>1)</sup>	Q	11.18	15.75	0.44	0.62	
D4H <sup>1)</sup>	R	15.75	31.75	0.62	1.25	
B3H <sup>1)</sup>	Т	2.7	3.3	0.106	0.128	
D3H <sup>1)</sup>	U	7.4	9.0	0.293	0.354	

<sup>1)</sup> Made with stainless steel construction.

#### Sensor Cable Selection Chart

Sensor cable codes for length and type options						
Cable length m (ft)	Standard (PVC jacket) -40+80 °C (-40+176 °F)	(polyethylene (teflon jacket) jacket) -40+80 °C -40+200 °C		-40+80 °C (-40+176 °F)		
	Order code					
6 (20)	<b>K01</b> <sup>1)</sup>	K11	K21	K31		
15 (50)	K02	K12 <sup>1)</sup>	K22	<b>K32</b> <sup>1)</sup>		
30 (100)	<b>K03</b> <sup>1)</sup>	<b>K13</b> <sup>1)</sup>	K23	K33		
46 (150)	<b>K04</b> <sup>1)</sup>	K14	K24	K34		
61 (200)	K05	K15	K25	K35		
91 (300)	K06	K16	K26	K36		

<sup>1)</sup> Standard MLFB for quick delivery

### RTD Cable Selection Chart

Cable length m (ft)	Standard (teflon wrapped) -40 +200 °C (-40 +392 °F)	Submersible (extruded jacket) -40 +200 °C (-40 +392 °F)
	Order code	
6 (20)	R01 <sup>1)</sup>	R11
15 (50)	<b>R02</b> <sup>1)</sup>	R12
30 (100)	<b>R03</b> <sup>1)</sup>	R13
46 (150)	R04	R14
61 (200)	R05	R15
91 (300)	R06	R16

<sup>1)</sup> Standard MLFB for quick delivery

SITRANS F US Clamp-on

## SITRANS FUG1010 (Gas)

## Overview



SITRANS FUG1010 clamp-on non-intrusive ultrasonic flow transmitter is ideal for natural and process gas applications, including checkmetering, allocation, production, storage and gas fired power station applications.

SITRANS FUG1010 is available in single, dual and optional four path configurations, with your choice of IP65 (NEMA 4X) wall mount, IP65 (NEMA 7) compact explosionproof, and IP66 (NEMA 7) wall mount explosionproof enclosures.

## Benefits

- · Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear as found in turbine and PD meters
- Eliminates the pressure drop or energy loss in orifice metering
- Wide turn-down ratio
- · Choice of single, dual or optional four path versions
- Single path version reduces initial investment
- Multiple path versions provide higher accuracy, especially with limited straight run and poor flow profile conditions
- In diametric reflect mode configuration, the meter is less sensitive to crossflow and swirl
- Wide-Beam technology provides improved accuracy over a wide range of flow velocity and operating pressure
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow
- Tolerant of most wet gas conditions
- Immune to most pressure reducing valve noise
- Optional rugged stainless steel sensor enclosure permits permanent and direct burial installations
- Easy to use "Si-Ware" diagnostic software

## Application

SITRANS FUG1010 is ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

### Design

SITRANS FUG1010 is available in three enclosures:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single path
  - Dual path
  - Four path (optional)
- IP65 (NEMA 7) compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single path
  - Dual path
- IP66 (NEMA 7) wall mount explosion proof enclosure constructed of cast aluminum stainless steel hardware, with glass window
  - Single path
  - Dual path
  - Four path (optional)

#### Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact flow transmitter has a 2 x 16 alphanumeric LCD display
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Analog inputs for pressure and temperature
- ZeroMatic Path automatically compensates for zero flow drift
- Bidirectional flow operation
- 1 Mbyte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options
- Internal AGA-8 table for fixed gas composition is available for standard volume computation.
- Complete application and operation diagnostics, to assure calibration and operational integrity
- Upward compatibility and compliance with AGA-10 speed of sound measurement practice

SITRANS F US Clamp-on

## SITRANS FUG1010 (Gas)

Technical specifications			
Input		Accuracy	
Flow range	$\pm$ 30 m/s (± 100 ft/s), bidirectional	Typical accuracy	1 % 2 % of actual volume
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent		reading (higher accuracy is pipe condition and flow profile dependent)
Minimum pressure	7 10 bar (100 145 psi), typical (gas composition and appli-	Calibratable Accuracy	± 0.2 0.5 % of flow
Pino nizo	cation dependent; plastic pipes support operation at atmospheric pressure)  25 mm 1.52 m (1" 48") (for		0.05 % 0.1 %, of actual volume reading, for 1.5 30 m/s (5 100 ft/s) velocities (pipe condition dependent)
	other sizes, consult factory)	Zero drift	0.0003 m/s (0.001 ft/s), with ZeroMatic Path active
Analog inputs	Current: 20 mA, programmable	Data refresh rate	5 Hz
	(IP65 (NEMA 7) enclosure has 20 mA, programmable)	Rated operation conditions	
Output	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Degree of protection	
Standard outputs	• Current: 20 mA, a programma-	Wall mount	IP65 (NEMA 4X)
	ble, standard	<ul> <li>Compact explosionproof</li> </ul>	IP65 (NEMA 7)
	Additional 2 x optional, except IP65 (NEMA 7)	<ul> <li>Wall mount explosionproof</li> </ul>	IP66 (NEMA 7)
	Voltage: 10 V DC, menu pro- grammable (None for IP65 (NEMA 7) enclo-	Gas temperature	-40 +60 °C (-40 +140 °F) (for higher temperatures consult factory)
	sure)	Ambient temperature	-18 +60 °C (0 140 °F)
	<ul> <li>Open collector digital pulses (quadrature)</li> </ul>	Design	
	(None for IP65 (NEMA 7) enclosure)	Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
	<ul> <li>Pulse rate: 5 kHz (None for IP65 (NEMA 7) enclosure)</li> </ul>	Weight	see diagrams
	Optically isolated digital pulse &	Power supply	
	source, IP65 (NEMA 7) enclosure only  VT100 RS 232	<ul> <li>For IP65 (NEMA 4X) and IP66 (NEMA 7)</li> </ul>	• 90 240 V AC, 50 60 Hz (30 VA) or 9 36 V DC (12 W)
Extended outputs	HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2	• For IP65 (NEMA 7):	• 90 240 V AC, 50 60 Hz (15 VA) or 9 36 V DC (10 W)
Status/Alarm I/O	Programmable form C relays	Indication and operation	
	(not for IP65 (NEMA 7) enclosure)	Data logger memory	1 Mbyte, programmable for 17 data functions
	<ul> <li>Programmable N.O. Mer. Wet. Relays optional (not for IP65</li> </ul>	Display	
	(NEMA 7) enclosure)     Optically coupled output logic	<ul> <li>IP65 (NEMA 4X) and IP66 (NEMA 7) enclosures</li> </ul>	128 x 240 pixel LCD with backlight
	gates (for IP65 (NEMA 7) enclosure, only)	• IP65 (NEMA 7) enclosure	2 x 16 alphanumeric LCD display
	• 1 Totalizer clear switch input	Keypad	
	(not for IP65 (NEMA 7))  • 1 Totalizer hold switch input	<ul> <li>IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures</li> </ul>	33 keypad buttons with tactile feedback
	(not for IP65 (NEMA 7) enclosure)	• IP65 (NEMA 7) Enclosure	5 magnetic hall effect switches
	Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclo- sure, only)	Language options	English, Spanish, German, Italian, French
	Opto iso. totalizer hold switch in- put (for IP 65 (NEMA 7) enclo- sure, only)		

## SITRANS FUG1010 (Gas)

IP65 (NEMA 4X) wall mount flow display transmitter ratings

FM and CSA

• Transmitter N-I Class I, Div 2 S Class II, Div 2

 Sensor I.S. Class I, II, Div 1

CE

EMC Directive 2004/108/EC ATEX Directive 94/9/EC

C-TICK

ATEX

• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5

• Sensors: Ex II 1 G Ex ia IIC T5

#### IP65 (NEMA 7) compact explosionproof enclosure ratings

FM and CSA

• Transmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2

• Sensor

I.S. Class I, II, Div 1

CE

EMC Directive 2004/108/EC ATEX Directive 94/9/EC

C-TICK

**ATEX** 

• Transmitter:

Ex II 2 (1) G Ex d [ia] IIB + H2 T5

• Sensors:

Ex II 1 G Ex ia IIC T5

## IP66 (NEMA 7) wall mount explosionproof enclosure ratings

FM and CSA

• Tranmitter

XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2

Sensor

I.S. Class I, II, Div 1

EMC Directive 2004/108/EC

ATEX Directive 94/9/EC

CE

C-TICK

**ATEX** 

• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB+H2 T5

• Sensors: Ex II 1 G Ex ia IIC T5

SITRANS F US Clamp-on

## SITRANS FUG1010 (Gas)

## Standard MLFB for quick delivery on SITRANS FUG1010 (Gas)

Selection and Ordering date	a	Article No.	Order code
SITRANS FUG1010 (Gas)		7 M E 3 6 1 0 - 0 -	K12 + K12 + R12
✓ Click on the Article No. for	r the online configuration in the PIA Life Cycle Portal.		
Design			
IP65 (NEMA 4X) wall mount		0	
Number of ultrasonic paths	3		
Dual path		2	
Flowmeter functions and I/o includes graphic or digital di			
<ul> <li>Extended I/O option</li> <li>additional 2 x 4 20 mA</li> <li>form C relays</li> <li>4 x digital pulse outputs (</li> </ul>	$2 \times \text{open collector and } 2 \times 0 \dots 5 \text{ V TTL})$	В	
Meter power options 9 36 V, DC (except compa	ct NEMA 7)	В	
Communication options			
VT100 RS 232		0	
HART, BACnet MSTP/BACne	t IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2	1	
RTD temperature sensor (includes mounting hardware	e for pipes above 1.5"/38 mm OD)		
No RTDs		0	
1 x standard clamp-on RTD		1	
2 x standard clamp-on RTD		2	
1 x submersible clamp-on R7 2 x submersible clamp-on R7		3 4	
Notes:	U .	*	
1. Temperature input is requi	red for FUH systems r set up as a dual channel can use 2 RTD's		
Sensor for channel 1 (includes pipe mounting kit a See "Sensor selection charts"	and spacer bar for indicated max. OD listed)  for specifications.		
no sensor		А	
C2H (high precision) <sup>1)</sup> D1H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 600 mm (24")	N P	
D2H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")  Mounting frame and straps provided up to 1200 mm (48")	Q	
Sensor for channel 2			
	and spacer bar for indicated max. OD listed)  " for specifications.		
no sensor		A	
C2H (high precision) <sup>1)</sup> D1H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 600 mm (24")  Mounting frame and straps provided up to 1200 mm (48")	N P	
D2H (high precision) <sup>1)</sup>	Mounting frame and straps provided up to 1200 mm (48")	Q	
Approvals			
FM/CSA/CE (default) ATEX, CE, C-TICK		1 2	
0			

Standard MLFB product offering represents 4 to 6 weeks delivery time For sensor and RTD cables for quick delivery see tables at end of section.

<sup>1)</sup> Made with stainless steel construction.

## SITRANS FUG1010 (Gas)

Selection and Ordering data	Article No.	Ord. code	Selection
SITRANS FUG1010 (Gas)			SITRANS
• IP65 (NEMA 4X) wall mount	7ME3610-		• IP65 (N
• IP65 (NEMA 7) compact explosionproof	7ME3611-		• IP65 (N
• IP66 (NEMA 7) wall mount explosion proof	7ME3613-		• IP66 (N
( ,	0 -		(
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Sensor fo
Number of channels/ultrasonic paths			for indica
Single path	1		See "Senstions.
Dual path	2		no senso
Special: Four path (NEMA 4X and NEMA 7 wall mount only)	9	H 1 A	For the fo
Flowmeter functions and I/O configurations (includes graphic or digital display)			(-41 °F B1H (high
IP65 (NEMA 4X) wall mount and IP66 (NEMA 7) wall mount explosionproof units			
Standard (all but NEMA 7 compact explosionproof)	A		B2H (high
- Graphic display - 4 x 4 20 mA analog input - 2 x 0 10 V			B3H (high
<ul><li>2 x 4 20 mA analog output</li><li>2 x pulse output</li><li>4 x Form C relays</li></ul>			C1H (high sion) <sup>2)</sup>
<ul> <li>2 x RTD input</li> <li>Extended I/O option</li> <li>additional 2 x 4 20 mA</li> </ul>	В		C2H (high sion) <sup>2)</sup>
<ul> <li>Form C relays</li> <li>4 x digital pulse outputs (2 x open collector and 2 x 0 5 V TTL)</li> </ul>			D1H (higl sion) <sup>2)</sup>
IP65 (NEMA 7) compact explosion proof units			D2H (higl
Standard	D		sion) <sup>2)</sup>
<ul> <li>Digital display</li> <li>2 x 4 20 mA (loop)</li> <li>2 x 4 20 mA analog input</li> <li>2 x status (open collector)</li> </ul>			D3H (high sion) <sup>2)</sup>
- 1 x RTD input			D4H (high
<ul> <li>Digital pulse option</li> <li>1 x digital pulse open collector output</li> </ul>	E		sion) <sup>2)</sup>
Meter power options			For the fo
90 240 V AC	A		(30 °F up
9 36 V DC (except NEMA 7 compact explo-	В		B1H (high
sionproof) 9 36 V DC negative GND (Compact only)	J		B2H (high B3H (high
9 36 V DC negative GND (Compact only)	K		C1H (high
Communication options			C2H (high
VT100 RS 232	0		D1H (high
HART, BACnet MSTP/BACnet IP, Modbus RTU	1		D2H (high
& TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232			D3H (higl D4H (higl
RTD temperature sensor (includes mounting hardware for pipes above 1.5" outer diameter)			
No RTDs		0	
1 x standard clamp-on RTD		1	
2 x standard clamp-on RTD		2	
1 x submersible clamp-on RTD 2 x submersible clamp-on RTD		3 4	

Selection and Ordering data		Article No.	Ord	. code
SITRANS FUG1010				
• IP65 (NEMA 4X) wa	7ME3610-			
• IP65 (NEMA 7) com	7ME3611-			
• IP66 (NEMA 7) wall	mount explosionproof	7ME3613-		
		0 -		
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection chart" for specifications.				
no sensor			Α	
perature range is -40 (-41 °F 150 °F), no	I to D4H sensors, tem- °C 65 °C minal 21 °C (70 °F): Trackmount and straps provided up to 125 mm (5")		K	
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L	
B3H (high precision)	Trackmount and straps provided up to 125 mm (5")		Т	
C1H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>1)</sup>		M	
C2H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>1)</sup>		N	
D1H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		P	
D2H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		Q	
D3H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		U	
D4H (high precision) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		R	
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):				
B1H (high temperature range HP) B2H (high temperature range HP) B3H (high temperature range HP) C1H (high temperature range HP) C2H (high temperature range HP) <sup>2)</sup> C2H (high temperature range HP) <sup>1)</sup> D1H (high temperature range HP) <sup>1)</sup> D2H (high temperature range HP) <sup>1)</sup> D3H (high temperature range HP) <sup>1)</sup> D4H (high temperature range HP) <sup>1)</sup>			Z Z Z Z Z Z Z Z	P1K P1L P1T P1M P1N P1P P1Q P1U

SITRANS F US Clamp-on

## SITRANS FUG1010 (Gas)

SITRANS FUGIUIU (Gas)						
Selection and Ordering data		Article No.	Ord	. co	de	
SITRANS FUG1010 (Gas)						ľ
IP65 (NEMA 4X) wall mount		7ME3610-				
IP65 (NEMA 7) compact explosionproof		7ME3611-				
• IP66 (NEMA 7) wall r		7ME3613-				
, ,		0 -		H		
Sensor for channel 2						-
(includes pipe mountir for indicated max. oute See "Sensor selection tions.	er diameter listed)					
no sensor			A			
,	C 65 °C		K			
B2H (high precision)	125 mm (5") Trackmount and straps provided up to		L			
B3H (high precision)	125 mm (5 <sup>ii</sup> ) Trackmount and straps provided up to		т			
C1H (high precision) <sup>2)</sup>	125 mm (5") Mounting frame and straps provided up to 500 mm (24") <sup>1)</sup>		М			
sion) <sup>2)</sup>	Mounting frame and straps provided up to 600 mm (24") <sup>1)</sup>		N			ı
$sion)^{2}$	Mounting frame and straps provided up to 1200 mm (48")		P			
sion) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		Q			
sion) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		U			
sion) <sup>2)</sup>	Mounting frame and straps provided up to 1200 mm (48") <sup>1)</sup>		R			
Other versions (difference pipe larger than DN 12 resistant), add Order of	200 (48") or corrosion		Z	Q 1	ΙY	
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F): B1H (high temperature range HP) B2H (high temperature range HP) B3H (high temperature range HP) C1H (high temperature range HP) C2H (high temperature range HP) <sup>2)</sup> C2H (high temperature range HP) <sup>2)</sup> D1H (high temperature range HP) <sup>2)</sup> D2H (high temperature range HP) <sup>2)</sup> D3H (high temperature range HP) <sup>2)</sup> D4H (high temperature range HP) <sup>2)</sup> D4H (high temperature range HP) <sup>2)</sup>			Z Z Z Z Z Z Z Z Z	0 0 0 0 0 0 0	I L I M I N I P I Q	
FM/CSA/CE/C-TICK (default) ATEX, CE, C-TICK			1 2			

1)	Supplied spacer bar supports pipes up to 750 mm (30 inch).	For pipes
	larger than 750 mm (30 inch) purchase also, spare part	
	7ME3960-0MS40 (1012BN-4).	

<sup>&</sup>lt;sup>2)</sup> Made with stainless steel construction.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of paths)	
See "Sensor cable selection chart"	K
Cable assembly for RTDs (add for # of RTDs)	
See "RTD cable selection chart"	R
Cable termination kit (for one cable pair)	
• Termination for standard, plenum and armored sensor	T01
cable	
<ul> <li>Termination for submersible sensor cable</li> </ul>	T11
<ul> <li>RTD cable termination kit for standard RTD</li> </ul>	T21
<ul> <li>RTD cable termination kit for submersible RTD</li> </ul>	T31
• Insert RTD cable termination kit	T41
Cable gland kit	T51
Languages (Meter and Documentation) for compact NEMA 7	
• German	B10
• French	B12
• Spanish	B13
• Italian	B14
Tag name plate	
Stainless steel tags with 3.2 mm (0.13 inch) characters (68 characters max.)	Y19

## MLFB example

## Application example

A clamp-on meter is required for a 300 mm (12") carbon steel gas line with a wall thickness of 12.7 mm (0.5"). Meter electronics are to be located in a Class I Div 2 area only 18 m (60 ft) from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement. Pulse output will be primary flow data source.

MLFB Article No.: **7ME3610-2BB00-0QQ1-Z K03 + K03** 

Selection and Ordering data	Article No. Ord. code
SITRANS FUG1010 meter family	7 ME 3 6 1 - 0 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0
IP65 (NEMA 4X) wall mount Dual path Option with digital pulse	0 2 B
9 36 V DC power option RS 232 Standard No RTD required Sensor code for path 1	B 0 0
Sensor code for path 2 FM approval required 30 m (100 ft) sensor cab. for path 1 30 m (100 ft) sensor cab. for path 2	1 1 K03 K03

SITRANS FUG1010 (Gas)

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUG1010	
English NEMA 4X wall mount & NEMA 7 wall mount explosionproof	A5E02951519
German NEMA 4X wall mount & NEMA 7 wall mount explosionproof	A5E02951531
English NEMA 7 compact explosionproof	CQO:1010GCXFM-3

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:

http://www.siemens.com/flowdocumentation

## High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Sensor	Order	Pipe wall (	oe wall (mm)		inch)
Pipe wall	Code	min.	max.	min.	max.
B1H	K	2.0	3.0	0.08	0.12
B2H	L	3.0	4.1	0.12	0.16
ВЗН	Т	2.7	3.3	0.106	0.128
C1H <sup>1)</sup>	M	4.1	5.8	0.16	0.23
C2H <sup>1)</sup>	N	5.8	8.1	0.23	0.32
D1H <sup>1)</sup>	Р	8.1	11.2	0.32	0.44
D2H <sup>1)</sup>	Q	11.2	15.7	0.44	0.62
D3H <sup>1)</sup>	U	7.4	9.0	0.293	0.354
D4H <sup>1)</sup>	R	15.7	31.8	0.62	1.25

<sup>1)</sup> Made with stainless steel construction.

## Sensor Cable (pair) Selection Chart

Sensor cable codes for length and type options					
Cable length m (ft)	Standard (PVC jacket) -40+80 °C (-40+176 °F)	Submersible (polyethylene jacket) -40+80 °C (-40+176 °F)	Plenum Rated (teflon jacket) -40+200 °C (-40+392 °F)	-40+80 °C (-40+176 °F)	
	Order code				
6 (20)	<b>K01</b> <sup>1)</sup>	K11	K21	K31	
15 (50)	K02	K12 <sup>1)</sup>	K22	<b>K32</b> <sup>1)</sup>	
30 (100)	<b>K03</b> <sup>1)</sup>	K13 <sup>1)</sup>	K23	K33	
46 (150)	<b>K04</b> <sup>1)</sup>	K14	K24	K34	
61 (200)	K05	K15	K25	K35	
91 (300)	<b>K06</b> <sup>1)</sup>	K16	K26	K36	

<sup>1)</sup> Standard MLFB for quick deliver

## RTD Cable (single) Selection Chart

RTD cable codes for length and type					
Cable length m (ft)	Standard (teflon wrapped) -40 +200 °C (-40 +392 °F)	Submersible (extruded jacket) -40 +200 °C (-40 +392 °F)			
	Order code				
6 (20)	R01 <sup>1)</sup>	R11			
15 (50)	R02 <sup>1)</sup>	R12			
30 (100)	R03 <sup>1)</sup>	R13			
46 (150)	R04	R14			
61 (200)	R05	R15			
91 (300)	R06	R16			

<sup>1)</sup> Standard MLFB for quick deliver

SITRANS F US Clamp-on

## SITRANS FUG1010 Gas check metering kit

#### Overview



The clamp-on SITRANS FUG1010 Gas check metering kit is an all-inclusive solution developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The kit is ideal for natural and process gas applications, including check metering, allocation, production, storage and gas fired power station applications. The flowmeter is available with FM/CSA or ATEX approval.

#### Benefits

- Performance check or verification of any type or brand of flow meter
- WideBeam technology provides improved accuracy over a wide range of flow velocity and operating pressure
- · Tolerant of most wet gas conditions
- Immune to most pressure reducing valve noise
- Fast, easy and cost-efficient on-site measurement of any convoluted pipe from 50 ... 1200 mm (2 ... 48") up to 15.7 mm (0.62") pipe wall thickness
- Delivered as an all inclusive kit in a sturdy rolling case that holds all the equipment needed to conduct performance and verification tests (cables, multiple sensors, transmitter, etc.)

## Application

The SITRANS FUG1010 Gas check metering kit is ideal for most natural and process gas industry applications, including:

- Check metering
- Allocation
- Flow survey verification
- · Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

#### Design

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
- Dual channel

## Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see Technical specification section for details)
- Analog inputs for pressure and temperature
- Internal AGA-8 table for fixed gas composition is available for standard volume computation
- Upward compatibility and compliance with AGA-10 speed of sound measurement practice
- Bi-directional flow operation
- English, Spanish, German, Italian and French language options

#### Technical specifications

Pipe sizes	50 1200 mm (2 48") up to 15.7 mm (0.62") pipe wall thick-
	ness
Accuracy	±0.5 %1.0 % of flow rate
Flow range	30 m/s (100 ft/s) bidirectional
Media temperature	-40+60 °C (-40 +140 °F)
Enclosure ratings	IP65 (NEMA 4X)

See page 3/368 for complete technical specifications

dee page 3/300 for complete technical specifications		
Cerificates and approvals		
FM and CSA	• Transmitter N-I Class I, Div 2 S Class II, Div 2	
	<ul> <li>Sensor</li> <li>I.S. Class I, II, Div 1</li> </ul>	
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5	
CE	Sensors:     Ex II 1 G Ex ia IIC T5     EMC Directive 2004/108/EC     ATEX Directive 94/9/EC	

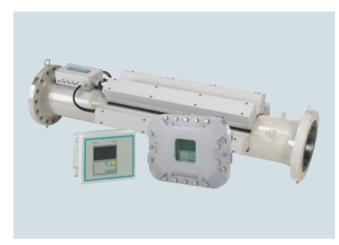
Selecti	on and Ordering data	Article No.
SITRAI	NS FUG1010 Gas Check Metering Kit	
• FM/C	SA approved	CQO:FUG-GASKIT
• ATEX	approved	CQO:FUG-GASAKIT
Conten	t of delivery	
1	Dual channel dedicated transmitter (FM/CSA or ATEX approved)	
1 pair	Transportable sensors C1 <sup>1)</sup> Pipe: od 3.500 inch, wt 0.216 inch, carbon steel	
1 pair	Transportable sensors C2 <sup>1)</sup> Pipe: od 6.625 inch, wt 0.280 inch, carbon steel	
1 pair	Transportable sensors D1 <sup>1)</sup> Pipe: od 10.750 inch, wt 0.365 inch, carbon steel	
1 pair	Transportable sensors D2 <sup>1)</sup> Pipe: od 16.000 inch, wt 0.500 , carbon steel	
2 pairs	Sensor cables 6m (20 ft)	
2 pairs	Mounting frames	
2	Spacer bar (dedicated)	
1	Mounting strap	
4	Couplant CC128	
1 kit	Couplant/Damping Film	
1	Flow case	
1	Flowmeter manual	

Laminated card set
 Made with stainless steel construction.

## SITRANS F US Clamp-on

## SITRANS FUT1010 (Liquid and Gas)

## Overview



SITRANS FUT1010 is the latest ultrasonic flow meter from Siemens. Ideal for applications within the liquid and gas hydrocarbon industry capable of providing custody transfer accuracy. With the newly developed permanent TransLoc<sup>TM</sup> mounting system, the sensors are permanently mounted on the outside of the pipe, eliminating any contact with the medium.

SITRANS FUT1010 is available in two different configurations; a version for liquid hydrocarbon applications and a version for precise gas measurement. Both versions are offered in pipe sizes ranging from 4 inch to 24 inch (DN 100 to DN 600) with flange ratings of ANSI Class 150/300/600 for liquid and 300/600 for gas.

#### Benefits

- Calibrated performance that meets custody transfer accuracy
- WideBeam® technology allows for precision flow measurement by reducing the meter's sensitivity to changes in the medium's physical properties
- TransLoc<sup>™</sup> permanent mounting system ensures sealing and virtually no maintenance
- · Available in a wide range of sizes
- High viscosity range (up to 2800 Cst)
- ZeroMatic Path<sup>TM</sup> capability automatically corrects for zero drift with no interruption of flow
- Completely cavity free design which eliminates any signal degrading buildup or ports to clog
- · Large bi-directional flow range
- Modbus RTU RS 232/485 output available
- · Dynamic Reynolds Number compensation

## Application

Liquid appl	ications	Gas applica	ations
Pipelines	Custody transfer, allocation, line balance, interface/densitometer	Upstream	Production wells, gathering, separation and dehydration
Terminals	Check metering, transmix metering, product identification	Midstream	Underground storage, transmission, compressor stations
Refineries	Process control, blending, tank mea- surement, ship load- ing and unloading	Down- stream	Electric power genera- tion, industrial use, gas processing plants
Transportation	Crude oil pipelines, LPG pipelines, multi- ple product pipelines, airport facilities, liquid terminals		
Down- stream	Petrochemical and processing plants		

#### Design

SITRANS FUT1010 is available in two different configurations, both featuring the TransLoc mounting system:

- A version for liquid hydrocarbon applications
- A version for precise gas measurement

#### Transmitter

SITRANS FUT1010 is available with two, three or four paths and IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosion proof enclosures.

## Sensor

Available sizes include 4 to 24 inch (DN 100 to DN 600) with flange ratings of ANSI Class 150, 300 and 600 for the liquid meter and ANSI Class 300 and 600 for gas.

If the installation warrants, SITRANS FUT1010 can be delivered with a ten diameter upstream and five diameter downstream tubes and a flow conditioner.

#### Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays readable up to 12 m (40 ft) away
- Current, voltage, status alarm, frequency and RS 232 outputs (see specification section for details)
- Analog inputs (see specification section for details)
- 1 MByte data logger with both site and data logger storage
- Standard or actual volume flow outputs
- Standard or actual totalize outputs
- Complete application and operation diagnostics, to ensure operational integrity
- Temperature provided by non-intrusive sensor (¾" tap available for insert temperature sensor)
- Detection of aeration or contamination

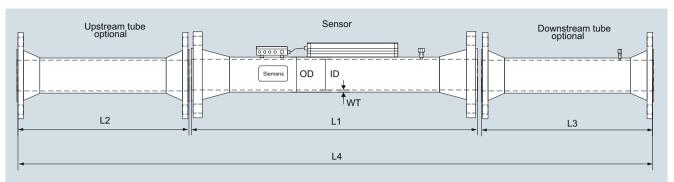
SITRANS F US Clamp-on

## SITRANS FUT1010 (Liquid and Gas)

Technical specifications			
Input		Design Flow sensor	
Flow range (Gas)	± 36.5 m/s (± 120 f/s) for	Nominal pipe sizes	4" 24" (DN 100 DN 600)
e.v .age (aae)	DN 100 DN 200 (4" 8") pipes	Pipe material specification	API 5L ERW
	bi-directional ± 30.5 m/s (± 100 ft/s) for	Temperature tap	3/4"
	DN 250 DN 600 (10" 24")	Pressure tap	1/4"
	pipes bi-directional	Flange class	
Flow range (Liquid)	± 12 m/s (± 40 f/s) including zero flow, bi-directional	• Liquid	150, 300, 600
Flow sensitivity	0.0003 m/s (0.001 f/s) flow rate independent	<ul> <li>Gas</li> <li>Flange specification</li> </ul>	300, 600 • ASME B16.5
Flow temperature range	-28 +93 °C (-20 +200°F)	. ange opeomeaten	• Liquid 150, 300, 600
Analog inputs	4 x 4 20 mA, (Programmable to Density, Pressure, viscosity or Temperature)	Flange facing	• Gas 300, 600 Raised face weld neck
Output	remperature)	Flange material	A105
Standard outputs	• 4x isolated 4 20 mA, program-	Flow sensor paths	Two, three, or four
Standard Outputs	mable	Sensor length	See diagram
	• 2x 0 10 V DC, programmable	Design temperature	-28 +93 °C (-20 +200 °F)
	<ul> <li>4x Digital Pulse outputs (2x open collector and 2x 0-5V TTL)</li> </ul>	Exterior finish	Marine/offshore grade per ASTM
	One each for positive flow, one each for negative flow	Optional pipe sections	B117 • 10 D upstream (with optional
	• Standard VT100 RS 232,	optional pipe sections	flow conditioner)
	Optional HART, BACnet MSTP/BACnet IP, Modbus RTU		• 5 D downstream
	& TCP/IP, Ethernet IP,	Certificates and approvals	
0	Johnson N2	Flow transmitter IP65 (NEMA 4X)	
Status/Alarm I/O	<ul> <li>Programmable, 4x Form C Relays</li> </ul>	FM and CSA	Transmitter
	Clear Switch Input Totalizer Hold Switch Input		N-I Class I, Div 2 S Class II, Div 2
Calibrated accuracy			Sensor     Class I II Div 1
Gas		ATEX	I.S. Class I, II, Div 1
2-path	0.5 1.0 % (4" 6" < 0.25 %)	AIEA	Ex II (1) G [Ex ia] IIC EX II 3 (1) G Ex nC [ia] IIC T5
3-path	< 0.5 %	CE markings	EMC 2004/108/EC
4-path	< 0.2 %		ATEX 94/9/EC
<u>Liquid</u>		Flow Transmitter - IP66 (NEMA 7)	
2-path	0.5 1.0 % (4" 6" < 0.15 %)	FM and CSA	• Transmitter
3-path	< 0.5 %		Ex Class I, Div 1 D-I Class II, Div 1
4-path	< 0.15 %		N-I Class I, Div 2
Repeatability	± 0.05 0.1 %		S Class II, Div 2 • Sensor
Data refresh rate	5 Hz		I.S. Class I, II, Div 1
Design		ATEX	Ex II (1) G [Ex ia] IIC
Design Flow transmitter			Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB +
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"	CE markings	H2 T5 `
Weight	see diagrams	CE markings	EMC 2004/108/EC ATEX 94/9/EC
Power supply		Sensor	
Power supply	90 240 V AC, 50 60 Hz, 30 VA or 9 36 V DC, 12 W	FM and CSA	I.S. Class I, Div 1 N-I Class I, Div 2 S Class II, Div 2
Indication and operation		ATEX	Ex II 1 G Ex ia IIC T5
Data logger memory	1 MByte, programmable for all available data variables	CE markings	EMC 2004/108/EC PED 97/23/EEC
Display	128 x 240 pixel LCD with back- light		ATEX 94/9/EC
Keypad	33 keypad buttons with tactile feedback		
Language options	English, Spanish, German, Italian, French		

## SITRANS FUT1010 (Liquid and Gas)

## Dimensional drawings



Length	1															
Liquid Flange Nominal O.D. Class 150		Nominal I.D.		Max operating pressure (psi)		Mat. Grade	Length L1		Length L2		Length L3		Length L4			
mm	inch	mm	inch	mm	inch	bar	psi		mm	inch	mm	inch	mm	inch	mm	inch
101.6	4.0	114.3	4.5	102.3	4.026	19.7	285.0	В	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	19.7	285.0	В	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	19.7	285.0	В	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.02	19.7	285.0	В	2184.4	86.0	2545.1	100.2	1272.5	50.1	6008.4	236.55
304.8	12.0	323.9	12.75	304.8	12.0	19.7	285.0	В	2184.4	86.0	3048.0	120.0	1524.0	60.0	6762.8	266.25
406.4	16.0	406.4	16.0	387.4	15.25	19.7	285.0	В	2184.4	86.0	3873.5	152.5	1938.0	76.3	8002.3	315.05
457.2	18.0	457.2	18.0	438.2	17.25	19.7	285.0	В	2501.9	98.5	4381.5	172.5	2192.0	86.3	9081.8	357.55
508.0	20.0	508.0	20.0	489.0	19.25	19.7	285.0	В	2501.9	98.5	4889.5	192.5	2446.0	96.3	9843.8	387.55
609.6	24.0	609.6	24.0	590.6	23.25	19.7	285.0	В	2501.9	98.5	5905.5	232.5	2954.0	116.3	11367.8	447.55

Length	Length															
Liquid Flange Nominal O.D. Class 300		Nominal I.D.		Max operating pressure (psi)		Mat. Grade	Length L1		Length L2		Length L3		Length L4			
mm	inch	mm	inch	mm	inch	bar	psi		mm	inch	mm	inch	mm	inch	mm	inch
101.6	4.0	114.3	4.5	102.3	4.026	51.0	740.0	В	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	51.0	740.0	В	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	51.0	740.0	В	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.020	51.0	740.0	В	2184.4	86.0	2544.1	100.2	1272.5	50.1	6008.4	236.55
304.8	12.0	323.9	12.75	304.8	12.0	51.0	740.0	В	2184.4	86.0	3048.0	120.0	1524.0	60.0	6762.8	266.25
406.4	16.0	406.4	16.0	381.0	15.0	51.0	740.0	В	2184.4	86.0	3810.0	150.0	1905.0	75.0	7905.8	311.25
457.2	18.0	457.2	18.0	428.7	16.876	51.0	740.0	В	2501.9	98.5	4287.5	168.8	2143.8	84.4	8939.5	351.95
508.0	20.0	508.0	20.0	477.9	18.814	51.0	740.0	X42	2501.9	98.5	4777.7	188.1	2390.1	94.1	9676.1	380.95
609.6	24.0	609.6	24.0	574.7	22.626	51.0	740.0	X42	2501.9	98.5	5748.0	226.3	2872.7	113.1	11129.0	438.15

Length	Length															
	Liquid Flange Nominal O.D. Class 600		Nominal I.D.		Max operating pressure (psi)		Mat. Grade	Length L1		Length L2		Length L3		Length L4		
mm	inch	mm	inch	mm	inch	bar	psi		mm	inch	mm	inch	mm	inch	mm	inch
101.6	4.0	114.3	4.5	102.3	4.026	96.6	1400.0	В	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	81.0	1175.0	В	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	193.7	7.625	102.1	1480.0	В	1828.8	72.0	1938.0	76.3	967.7	38.1	4740.9	186.65
254.0	10.0	273.1	10.75	247.7	9.75	82.8	1200.0	В	2184.4	86.0	2476.5	97.5	1239.5	48.8	5906.8	232.55
304.8	12.0	323.9	12.75	298.5	11.75	79.3	1150.0	В	2184.4	86.0	2984.5	117.5	1493.5	58.8	6668.8	262.55
406.4	16.0	406.4	16.0	373.1	14.688	82.8	1200.0	В	2184.4	86.0	3731.3	146.9	1864.4	73.4	7786.4	306.55
457.2	18.0	457.2	18.0	419.1	16.5	86.2	1250.0	В	2501.9	98.5	4191.0	165.0	2095.5	82.5	8794.8	346.25
508.0	20.0	508.0	20.0	466.8	18.376	82.8	1200.0	X42	2501.9	98.5	4668.5	183.8	2334.3	91.9	9511.0	374.45
609.6	24.0	609.6	24.0	560.4	22.064	77.6	1125.0	X42	2501.9	98.5	5603.2	220.6	2801.6	110.3	10913.1	429.65

SITRANS F US Clamp-on

## SITRANS FUT1010 (Liquid and Gas)

Length	Length															
Gas Cla	as Class 300 Nominal O.D.		al O.D.	Nominal I.D.		Max operating pressure (psi)		Mat. Grade	Length L1		Length L2		Length L3		Length L4	
mm	inch	mm	inch	mm	inch	bar	psi		mm	inch	mm	inch	mm	inch	mm	inch
101.6	4.0	114.3	4.5	102.3	4.026	51.0	740.0	В	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	51.0	740.0	В	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	51.0	740.0	X42	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.020	51.0	740.0	X42	1828.8	72.0	2545.1	100.2	1272.5	50.1	5652.8	222.55
304.8	12.0	323.9	12.75	303.2	11.938	51.0	740.0	X42	1828.8	72.0	3032.8	119.4	1516.4	59.7	6384.3	251.35
406.4	16.0	406.4	16.0	381.0	15.0	51.0	740.0	X42	1981.2	78.0	3810.0	150.0	1905.0	75.0	7702.6	303.25
457.2	18.0	457.2	18.0	428.7	16.876	51.0	740.0	X42	1981.2	78.0	4287.5	168.8	2143.8	84.4	8418.8	331.45
508.0	20.0	508.0	20.0	477.9	18.814	51.0	740.0	В	1981.2	78.0	4777.7	188.1	2390.1	94.1	9155.4	360.45
609.6	24.0	609.6	24.0	574.7	22.626	51.0	740.0	В	1981.2	78.0	5748.0	226.3	2872.7	113.1	10608.3	417.65

Length	_ength															
Gas Cl	s Class 600 Nominal O.D.		al O.D.	Nominal I.D.		Max operating pressure (psi)		Mat. Grade	Length L1		Length L2		Length L3		Length L4	
mm	inch	mm	inch	mm	inch	bar	psi		mm	inch	mm	inch	mm	inch	mm	inch
101.6	4.0	114.3	4.5	102.3	4.026	102.1	1480.0	X42	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	96.6	1400.0	X42	1828.8	72.0	1541.8	60.7	769.9	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	87.9	1275.0	X42	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	247.7	9.75	102.1	1480.0	X42	1981.2	78.0	2476.5	97.5	1239.5	48.8	5703.6	224.55
304.8	12.0	323.9	12.75	298.5	11.75	94.8	1375.0	X42	1981.2	78.0	2984.5	117.5	1493.5	58.8	6465.6	254.55
406.4	16.0	406.4	16.0	381.0	15.0	75.9	1100.0	X42	1981.2	78.0	3810.0	150.0	1905.0	75.0	7702.6	303.25
457.2	18.0	457.2	18.0	428.7	16.876	75.9	1100.0	X42	1981.2	78.0	4287.5	168.8	2143.8	84.4	8418.8	331.45
508.0	20.0	508.0	20.0	477.9	18.814	75.9	1100.0	X42	1981.2	78.0	4777.7	188.1	2390.1	94.1	9155.4	360.45
609.6	24.0	609.6	24.0	574.7	22.626	72.4	1050.0	X42	1981.2	78.0	5748.0	226.3	2872.7	113.1	10608.3	417.65

# **Flow Measurement** SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

# SITRANS FUT1010 Liquid sizing chart

Nominal diameter		Q <sub>min</sub>	Q <sub>max</sub>	Q <sub>min</sub>	Q <sub>max</sub>
mm	inch	[m <sup>3</sup> /h]	[m <sup>3</sup> /h]	[42 GAL BBL/h]	[42 GAL BBL/h]
100	4	14	360	85	2267
150	6	29	818	180	5146
200	8	46	1417	290	8910
250	10	67	2233	421	14045
300	12	80	3203	504	20143
400	16	103	5172	651	32532
450	18	116	6618	728	41625
500	20	124	8241	778	51836
600	24	150	12022	945	75617

# SITRANS FUT1010 Gas sizing chart

	SITRANS FUT1010 maximum flow rate (MMSCFD)		[Millions of standard cubic feet per day]					
	Meter size a	and maximum v	elocity					
	4"	6"	8"	10"	12"	16"	20"	24"
Pressure (psig)	135 ft/s	126 ft/s	117 ft/s	144 ft/s	126 ft/s	99 ft/s	81 ft/s	90 ft/s
100	8.2	17.3	27.9	54.1	67.1	83.3	107.1	174.9
200	15.5	32.9	52.9	102.7	127.6	158.2	203.4	332.3
300	23.1	49.0	78.7	152.8	189.8	235.4	302.6	494.5
400	30.9	65.5	105.3	204.4	253.9	315.0	404.8	661.5
500	39.0	82.6	132.8	257.6	320.0	396.9	510.1	833.6
600	47.3	100.1	161.0	312.4	388.0	481.2	618.5	1010.8
700	55.8	118.2	190.0	368.7	457.9	568.1	730.1	1193.1
800	64.6	136.8	219.8	426.6	529.9	657.3	844.8	1380.5
900	73.6	155.8	250.5	486.1	603.8	749.0	962.6	1573.1
1000	82.8	175.4	282.0	547.2	679.6	843.0	1083.5	1770.6
1100	92.3	195.4	314.1	609.6	757.1	939.2	1207.1	1972.7
1200	101.9	215.9	347.0	673.3	836.3	1037.4	1333.3	2178.9

	SITRANS F	UT1010 maximi	um flow rate (MI	MSCFD) [Millions	s of standard cu	bic feet per day	y]		
	Meter size and maximum velocity			[Minimum f	[Minimum flow rate above which 0.2 % accuracy can be maintained]				
	4"	6"	8"	10"	12"	16"	20"	24"	
ressure osig)	1.55 ft/s	1.4 ft/s	1.3 ft/s	1.65 ft/s	1.35 ft/s	1.1 ft/s	0.85 ft/s	1 ft/s	
00	0.1	0.2	0.3	0.6	0.7	0.9	1.1	1.9	
00	0.2	0.4	0.6	1.2	1.4	1.8	2.1	3.7	
00	0.3	0.5	0.9	1.8	2.0	2.6	3.2	5.5	
00	0.4	0.7	1.2	2.3	2.7	3.5	4.2	7.4	
00	0.4	0.9	1.5	3.0	3.4	4.4	5.4	9.3	
00	0.5	1.1	1.8	3.6	4.2	5.3	6.5	11.2	
00	0.6	1.3	2.1	4.2	4.9	6.3	7.7	13.3	
00	0.7	1.5	2.4	4.9	5.7	7.3	8.9	15.3	
00	0.8	1.7	2.8	5.6	6.5	8.3	10.1	17.5	
000	1.0	1.9	3.1	6.3	7.3	9.4	11.4	19.7	
100	1.1	2.2	3.5	7.0	8.1	10.4	12.7	21.9	
200	1.2	2.4	3.9	7.7	9.0	11.5	14.0	24.2	

SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

	SITRANS FUT1010 Maximum Flow Rate (Nm <sup>3</sup> /h x 1000)			[Thousands of normal cubic meters per hour]				
	DIN meter s	ize and maximu	m velocity					
	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm	500 mm	600 mm
Pressure (barg)	41.1 m/s	38.4 m/s	35.6 m/s	43.9 m/s	38.4 m/s	30.1 m/s	24.6 m/s	27.4 m/s
10	13.5	28.7	46.1	89.5	111.2	137.9	177.2	289.6
20	26.4	55.9	89.9	174.5	216.7	268.8	345.5	564.6
30	39.8	84.4	135.6	263.2	326.9	405.5	521.2	851.8
10	53.9	114.1	183.4	355.8	441.9	548.2	704.6	1151.4
50	68.5	145.0	233.1	452.4	561.9	697.0	895.9	1464.0
00	83.7	177.2	284.9	552.9	686.7	851.9	1094.8	1789.2
0	99.5	210.7	338.7	657.2	816.3	1012.6	1301.5	2126.9
30	115.8	245.3	394.3	765.1	950.2	1178.7	1514.9	2475.8
90	132.6	280.8	451.4	875.9	1087.8	1349.4	1734.3	2834.3
100	149.7	317.1	509.7	989.1	1228.5	1523.9	1958.6	3200.8
10	167.1	353.8	568.8	1103.8	1370.9	1700.6	2185.7	3571.9
20	184.5	390.8	628.2	1218.9	1514.0	1878.0	2413.7	3944.5

		SITRANS FUT1010 Transition Flow Rate (Nm <sup>3</sup> /h x 1000)			[Thousands of normal cubic meters per hour]					
	DIN meter size and maximum velocity			Minimum flow rate above which 0.2 % accuracy can be maintained						
	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm	500 mm	600 mm		
Pressure (barg)	0.47 m/s	0.42 m/s	0.39 m/s	0.50 m/s	0.41 m/s	0.33 m/s	0.25 m/s	0.30 m/s		
10	0.2	0.3	0.5	1.0	1.2	1.5	1.9	3.2		
20	0.3	0.6	1.0	2.0	2.3	3.0	3.6	6.3		
30	0.5	0.9	1.5	3.0	3.5	4.5	5.5	9.5		
40	0.6	1.3	2.0	4.1	4.7	6.1	7.4	12.8		
50	0.8	1.6	2.6	5.2	6.0	7.7	9.4	16.3		
60	1.0	2.0	3.2	6.3	7.4	9.5	11.5	19.9		
70	1.1	2.3	3.8	7.5	8.7	11.3	13.7	23.6		
80	1.3	2.7	4.4	8.8	10.2	13.1	15.9	27.5		
90	1.5	3.1	5.0	10.0	11.7	15.0	18.2	31.5		
100	1.7	3.5	5.7	11.3	13.2	16.9	20.6	35.6		
110	1.9	3.9	6.3	12.6	14.7	18.9	22.9	39.7		
120	2.1	4.3	7.0	14.0	16.2	20.9	25.3	43.8		

# Flow Measurement SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Article No.	Order C
SITRANS FUT1010 (Liquid)	7 ME 3 6 2 0 0	
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Transmitter type		
No Transmitter	0	
P65 NEMA 4X (2 path)	ĭ	
P65 NEMA 4X (2 path) with optional communications	2	
IP65 NEMA 4X (3 or 4 path)	3	
IP65 NEMA 4X (3 or 4 path) with optional communications	4	
IP66 NEMA 7 wall mount/explosionproof (2 Path)	5	
P66 NEMA 7 wall mount/explosionproof (2 Path) with optional communications	6	
P66 NEMA 7 wall mount/explosionproof (3 or 4 Path)	7	
P66 NEMA 7 wall mount/explosionproof (3 or 4 Path) lwith optional communications	8	
Input power		
90 240 V AC	1	
9 36 V DC	2	
Number of ultrasonic paths		
2 path	В	
3 path	C	
4 path	D	
Pipe size		
DN 100 (4") (Dual Path only)	A	
DN 150 (6")(Dual Path only)	В	
DN 200 (8")	C	
DN 250 (10")	D	
DN 300 (12")	E	
DN 400 (16")	F	
DN 450 (18")	G	
DN 500 (20")	н	
DN 600 (24")	J	
Flange rating		
Class 150 (Raised Face)	0	
Class 300 (Raised Face)	1	
Class 600 (Raised Face)	2	
•		
Upstream/downstream meter run		
None	0	
10 pipe diameter upstream Tube only	1	
10 pipe diameter upstream Tube with flow conditioner	2	
5 pipe diameter downstream tube only	3	
10D up and 5D downstream tubes	4	
10D up <u>and</u> 5D downstream tubes with flow conditioner	5	
Liquid type range (select closest match)		
Water	A	
Multiple Crude Oils	В	
Light Crude only	С	
Heavy Crude only	D	
Multiple Finished Products	E	
Gasolines Only	F	
Kerosene	G	
Jet Fuel	H	
Diesel	 J	
Multiple Fuel Oils	K	
Heavy Fuel Oils		
Liquified Gases	L M	
Liquid temperature range	III	
-28 +65 °C (-20 +150 °F )	A	
1 93 °C (30 200 °F)	В	
Transmitter and sensor approval		
FM/CSA, CE	1	
ATEX and PED, CE, C-TICK	2	

SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for flow sensor (add one K per flow path)	
<ul> <li>Cable and termination for one sensor path (see "Sensor cable chart for options")</li> </ul>	K
<ul> <li>Termination for user supplied cable</li> </ul>	T01
Cable assembly for temperature sensor (only 1 required)	
<ul> <li>Cable and termination for temperature sensor (see "Transducer cable chart for options").</li> </ul>	R
Termination for user supplied RTD cable	T31
Nace Certification	
Nace, Spool only	C10
Nace, W/10D upstream	C11
<ul> <li>Nace, W/10D upstream, cond</li> </ul>	C12
Nace, W/5D downstream	C13
Nace, W/10D up, 5D dn	C14
• Nace, W/10D up, cond, 5D dn	C15
Standard Cal: Oil (2 cst), Forward flow direction, 6 points, 6 verification points, Range 2 20 ft/sec, Lab pressure and temperature	
<ul> <li>Calibration, 100 DN (4 inch)</li> </ul>	D10
• Calibration, 150 DN (6 inch)	D11
Calibration, 200 DN (8 inch)     Calibration, 250 DN (40 inch)	D12
<ul><li>Calibration, 250 DN (10 inch)</li><li>Calibration, 300 DN (12 inch)</li></ul>	D13 D14
• Calibration, 400 DN (16 inch)	D15
• Calibration, 450 DN (18 inch)	D16
<ul> <li>Calibration, 500 DN (20 inch)</li> </ul>	D17
Calibration, 600 DN (24 inch)	D18
Calibration, Other contact factory for quote	Y28
Tag name plate • Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUT1010 (Liquid)	
English NEMA 4X wall mount NEMA 7 wall mount explosion proof	A5E02639184
German NEMA 4X wall mount & NEMA 7 wall mount explosion proof	A5E03086468

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

# Flow Measurement SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Article No.	Order Cod
SITRANS FUT1010 (Gas)	7 ME 3 6 3 0	
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Transmitter type		
No meter	0	
P65 NEMA 4X (2 path)	1	
IP65 NEMA 4X (2 path) with Modbus	2	
IP65 NEMA 4X (3 or 4 path)	3	
IP65 NEMA 4X (3 or 4 path) with Modbus	4	
IP66 NEMA 7 wall mount flame/explosion proof (2 Path)	5	
IP66 NEMA 7 wall mount flame/explosion proof (2 Path) with Modbus	6	
IP66 NEMA 7 wall mount flame/explosion proof (3 or 4 Path)	7	
P66 NEMA 7 wall mount flame/explosion proof (3 or 4 Path) with Modbus	8	
Input power		
90 240 V AC	1	
9 36 V DC	2	
Number of ultrasonic paths		
2 path (standard enclosure material)	В	
3 path (standard material)	C	
4 path (standard material)	D	
Pipe size		
DN 100 (4") (Dual Path only)	A	
DN 150 (6")(Dual Path only)	В	
DN 200 (8")	C	
DN 250 (10")	D	
DN 300 (12")	<u> </u>	
DN 400 (16")	F	
DN 450 (18")	G	
DN 500 (20")	H	
DN 600 (24")		
Flange rating		
Class 300 (Raised Face)	1	
Class 600 (Raised Face)	2	
Upstream/downstream meter run		
None	0	
10 pipe diameter upstream Tube only	1	
10 pipe diameter upstream Tube with flow conditioner 5 pipe diameter downstream tube only	2	
5 pipe diameter downstream tube only 10D up and 5D downstream tubes	3 4	
10D up and 5D downstream tubes with flow conditioner	5	
Gas type range (select closest match)		
Natural Gas (mostly CH <sub>4</sub> )	A	
Process Gases (N <sub>2</sub> , O <sub>2</sub> , CO, Ar)	B	
Helium	c	
Hydrogen	D	
Gas temperature range		
-28 +65 °C (-20 +150 °F )	A	
1 93 °C (30 200 °F)	В	
Transmitter and sensor approval	-	
FM/CSA, CE		1
ATEX and PED, CE, C-TICK		2

SITRANS F US Clamp-on

# SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for flow sensor (Add one K per flow path)	
<ul> <li>Cable and termination for one sensor path (see "Transducer cable chart for options")</li> </ul>	K
<ul> <li>Termination for user supplied cable</li> </ul>	T01
Cable assembly for temperature sensor (only 1 required)	
<ul> <li>Cable and termination for temperature sensor (see "Transducer cable chart for options").</li> </ul>	R
• Termination for user supplied RTD cable	T31
Nace Certification	
Nace, Spool only	C10
Nace, W/10D upstream	C11
<ul> <li>Nace, W/10D upstream, cond</li> </ul>	C12
Nace, W/5D downstream	C13
• Nace, W/10D up, 5D dn	C14
• Nace, W/10D up, cond, 5D dn	C15
Standard Cal: Nat Gas, Forward flow direction, 7 points, 2 verification points, Range 10 100 ft/sec, Lab pressure and temperature	
<ul> <li>Calibration, 100 DN (4 inch)</li> </ul>	D10
• Calibration, 150 DN (6 inch)	D11
Calibration, 200 DN (8 inch)     Calibration, 250 DN (10 inch)	D12 D13
<ul><li>Calibration, 250 DN (10 inch)</li><li>Calibration, 300 DN (12 inch)</li></ul>	D13
• Calibration, 400 DN (16 inch)	D15
<ul> <li>Calibration, 450 DN (18 inch)</li> </ul>	D16
• Calibration, 500 DN (20 inch)	D17
<ul><li>Calibration, 600 DN (24 inch)</li><li>Calibration, Other contact factory for quote</li></ul>	D18 Y28
Tag name plate	120
Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUT1010 (Gas)	
English NEMA 4X wall mount & NEMA 7 wall mount explosionproof	A5E02639185
German NEMA 4X wall mount & NEMA 7 wall mount explosion proof	A5E03086485

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

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# Flow Measurement SITRANS F US Clamp-on

**Accessories/Spare parts** 

#### Accessories/Spare parts for clamp-on ultrasonic flowmeters

# Description

#### Article No

#### Universal Portable Sensors 7ME3951-...

Selected generally for portable systems where a wide variety of pipes are to be measured. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected as a cost savings on applications where standard accuracy is sufficient.



#### **High Precision Sensors**

Selected generally for dedicated meters since the need to cover a range of pipes is not a requirement. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy/repeatability is required. They are only applica-ble to steel pipes but no other metals, and are selected solely by wall thickness.



#### **High Temperature Sensors**

Are selected whenever pipe temperature will exceed 250 °F (120°C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Made with stainless steel construction.





#### **High Precision Mount**

These provide the most secure and strongest mounting of the flow sensors. They are generally selected for "High End" meter types where maximum performance criteria applies. They accommodate high precision sensors designed to mount inside these enclosures. May be welded to the pipe if so desired by the customer. They come in 2-piece or 1-piece configurations depending upon the application pipe size and type (Liquid/Gas).





#### Mounting tracks

Typically used on smaller pipes for easier and more stable mounting for dedicated universal style sensor size A or B, also available for dedicated high precision sensor size A or B.



7ME3960-...



#### Magnetic mounting frames

Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E

universal and high-precision sensors belonging to the SITRANS F US clamp-on family, magnetic mounting frames can be installed on any carbon steel pipe and are constructed in aluminum for a high level of durability.

#### 7ME3960-0MD02



#### Description **Mounting Frames**

These items are useful in simplifying sensor installation. They are strapped to the pipe first then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring conformation to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.

#### Article No. 7ME3960-...



#### **Spacer Bars**

Sensors are required to be mounted at a set distance from each other as determined by pipe size and medium being measured. The spacer bar simplifies this requirement by eliminating the need to undertake a precise dimensional measurement. The flowmeter will specify a specific spacing index which is easily accommodated with the marked indices on the





#### Clamp-On RTD's

1000  $\Omega$  platinum RTD's for use where temperature is required. Used with Energy Meters to record supply/return temperature. For this purpose precision matched pairs (to 0.02 °C) are supplied. Single RTD's are also used with SITRANS FUH and SITRANS FUG meters to enable live calculations of "Liquident" and Standard Volume Correction.





#### Insert RTD's

Are identical to clamp-on RTD's as described above except that they are inserted into the pipe (In a Thermowell). They provide more precise and quicker responding temperature measurement. They are selected when precise temperature measurement of the actual liquid or gas is required as opposed to pipe "skin temperature". Since they project into the pipe they cannot be used in pipeline that undergo periodic "pigging".





#### Standard Cable (Flow Sensor or RTD)

Selected for general purpose installations where no special application requirements exist.

7ME3960-...



#### Submersible Cable (Flow Sensor)

Polyethylene jacketed, for locations that experience periodical or continual submersion of the flow sensors

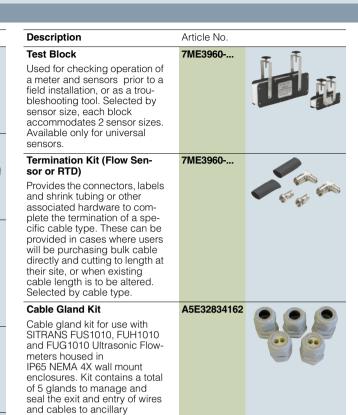
7ME3960-...



devices.

# Flow Measurement SITRANS F US Clamp-on

Description	Article No.	
Plenum Cable (Flow Sensor or RTD)	7ME3960	
For temperatures above 180 °F. Teflon jacketed to withstand high temperatures, is used when high temp sensors are specified.		
Armored Cable (Flow Sensor)	7ME3960	
Double shielded cable, selected when cable will not be installed in conduit between meter and sensors.		
Temperature sensor cable Cable to connect field installed RTD to flow meter, available in Teflon wrapped, plenum or submersible grade. Typically used for SITRANS FUE, FUH and FUG series meters where a temperature sensor is employed.	7ME3960	
Straps	7ME3960	
Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.		
Chains (EZ clamps)	7ME3960	
Used to fasten portable sensors or mounting frames to pipe. Thumbscrews eliminate need for hand tools when mounting sensors, and allow for easy on/off operations.		
Ultrasonic Couplant	7ME3960	figur-m
Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).		Super Lube Probate Super
Dry Couplant	7ME3960	•
The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).		
Damping Material	7ME3960	1111111
Used with gas meters, and required as part of their sensor installation. This material absorbs excess ultrasonic energy from the pipe wall to enable the meter to detect and operate with low amplitude sensor signals normally associated with Clamp-on Gas appli-		



# Flow Measurement SITRANS F US Clamp-on

Selection and Ordering data	Article No.
Spare parts (System)	
SITRANS F US clamp-on	7ME 3 9 4 0 -
Power supplies, batteries and chargers	
Power supply 90 240 V AC	
<ul> <li>for IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosion proof</li> </ul>	0 P A 0 0
• for IP65 (NEMA 7) compact explosionproof	2 P A 0 0
Power supply 9 36 V DC	
<ul> <li>for IP65 (NEMA 4X) wall mount or IP66 (NEMA7) wall mount explosionproof</li> </ul>	0 P B 0 1
<ul> <li>negative ground for NEMA 7 compact explosionproof</li> </ul>	2 P J 0 0
<ul> <li>positive ground for NEMA 7 compact explosionproof</li> </ul>	2 P K 0 0
Portable meter batteries and accessories	
<ul> <li>Internal battery (Portable meters only)</li> </ul>	3 P P 0 0
IP67 Portable meter charger	
• Type A for Europe (CEE7/7)	3 P C 0 0
Type C for Australia (AS3112)	3 P D 0 0
• Type D for UK (BS1363)	3 P E 0 0
• Type J for Japan (JIS8303)	3 P F 0 0
• Type K for US (NEMA 5-15P)	3 P G 0 0
Type L for Switzerland (SEV1011)	3 P H 0 0
IP40 Portable meter charger	
• Type A for Europe (CEE7/7)	4 P C 0 0
Type C for Australia (AS3112)	4 P D 0 0
• Type D for UK (BS1363)	4 P E 0 0
• Type J for Japan (JIS8303)	4 P F 0 0
• Type K for US (NEMA 5-15P)	4 PG 0 0
Type L for Switzerland (SEV1011)	4 P H 0 0
Modbus system computer modules	
Communication Module W/VT100 RS232, BACnet MSTP / BACnet IP, Ethernet IP, Modbus RTU / TCPIP, Johnson N2	A5E32589005
Mounting kit (Meter functions) for Communication module	CQO:1015N-5M-MK1
Mounting kit (type 2) for Communication module	CQO:1015N-5M-MK2
Mounting kit (type 3) for Communication module	CQO:1015N-5M-MK3
Field configuration kit with manual, for Modbus converter module	CQO:1015N-5M-FK1
Pipe mounting brackets	
2 inch pipe mounting bracket for IP65 (NEMA 7) compact explosionproof	CQO:1012XMB-1
2 inch pipe mounting bracket for IP65 (NEMA 4X) wall mount	CQO:1012NMB-1

SITRANS F US Clamp-on

Selection and Ordering data	Article No.	
Spare parts (Sensors)		
SITRANS F US clamp-on		
Meter type		
Dedicated (SITRANS FUS1010, FUG1010, FUH1010, FUE1010)	7ME3950-	
Portable (SITRANS FUP1010 or FUE1010)	7ME3951-	0====
Approvals		
UL, ULc, CE (Portable only) <sup>1)</sup>		0
FM/CSA hazardous (classified) locations <sup>1)</sup>		1
ATEX Ex II 1G Ex ia IIC T5 (not for RTDs) <sup>1)</sup>		2
Temperature range ( High Precision Sensors)		
Standard temperature: -40 +65 °C (-40 150 °F)		0
High temperature T2: -1 104 °C (30 220 °F)		2
High temperature T3: 32 121 °C (90 250 °F)		3
Spare sensor code		
For liquid flow sensors pipe ranges please refer to sensor selection chart in the SITRANS FUS1010 section		
Liquid flow sensors for use with mounting frames or tracks (including portable)		
A2 universal		LB00
B3 universal		LC00
C3 universal <sup>3)</sup>		LD00
D3 universal <sup>3)</sup>		LE00
E2 universal <sup>3)</sup>		LF00
A1H (high precision)		LG00
A2H (high precision)		L H 0 0
A3H (high precision)		LJ00
B1H (high precision)		LK 0
B2H (high precision)		LL 0
B3H (high precision)		LT 0
C1H (high precision) <sup>3)</sup>		LM 0
C2H (high precision) <sup>3)</sup>		LN 0
D1H (high precision) <sup>3)</sup>		LP 0
D2H (high precision) <sup>3)</sup>		LQ 0
D3H (high precision) <sup>3)</sup>		LU 0
D4H (high precision) <sup>3)</sup>		LR 0
Doppler, for up to 121 °C (250 °F)		LS00
High temperature universal liquid sensors		
High temp. sensor size 1 for up to 230 °C (12.7 to 100 mm diam.)		LA10
High temp. sensor size 2 for up to 230 °C (30 to 200 mm diam.)		L A 2 0
High temp. sensor size 3 for up to 230 °C (150 to 600 diam.)		LA30
High temp. sensor size 4 for up to 230 °C (400 to 1200 diam.)		L A 4 0

Selection and Ordering data	Article No.
Spare parts (Sensors)	
SITRANS F US clamp-on	
Meter type	
Dedicated (SITRANS FUS1010, FUG1010, FUH1010, FUE1010)	7ME 3 9 5 0 -
Portable (SITRANS FUP1010 or FUE1010)	7ME 3 9 5 1 - 0
For gas flow sensors pipe ranges please refer to sensor selection chart in the SITRANS FUG1010 section	
High precision gas flow sensors for use with mounting frames or tracks	
B1H (high precision) <sup>2)</sup>	GK 0
B2H (high precision) <sup>2)</sup>	GL 0
B3H (high precision) <sup>2)</sup>	GT 0
C1H (high precision) <sup>2)3)</sup>	GM 0
C2H (high precision) <sup>2)3)</sup>	GN 0
D1H (high precision) <sup>2)3)</sup>	GP 0
D2H (high precision) <sup>2)3)</sup>	GQ 0
D3H (high precision) <sup>2)3)</sup>	GU 0
D4H (high precision) <sup>2)3)</sup>	GR 0
Standard RTD sensors (not for energy systems)	
Standard clamp-on RTD	1 T A 0 0
Submersible clamp-on RTD (not for Portable)	1TB00
Insertion style RTD each (size 1), 140 mm (5.5 inch)	1 T J 0 0
Insertion style RTD each (size 2), 216 mm (8.5 inch)	1 T J 0 1
Insertion style RTD each (size 3), 292 mm (11.5 inch)	1 T J 0 2
Insertion style RTD each (size 4), 368 mm (14.5 inch)	1 T J 0 3
Standard for energy system (matched pair)	
Standard clamp-on RTD with mounting	1 T A 1 0
Insertion style RTD pair (size 1) for SITRANS FUE1010, 140 mm (5.5 inch)	1 T J 1 0
Insertion style RTD pair (size 2) for SITRANS FUE1010, 216 mm (8.5 inch)	1TJ11
Insertion style RTD pair (size 3) for SITRANS FUE1010, 292 mm (11.5 inch)	1 T J 1 2
Insertion style RTD pair (size 4) for SITRANS FUE1010, 368 mm (14.5 inch)	1 T J 1 3

<sup>1)</sup> Products are marked with CE as required by european directive.

<sup>2)</sup> T3 range not available.

<sup>3)</sup> Made with stainless steel construction.

# Flow Measurement SITRANS F US Clamp-on

Selection and Ordering data	Article No.		Selection
Spare parts (Miscellaneous)			Spare pa
SITRANS F US clamp-on	7ME 3 9 6 0 -		SITRANS
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Stainless mounting
Meter design			<ul> <li>Mountin (13 inch</li> </ul>
IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosionproof	0		Mountin
IP65 (NEMA 7) compact	2		(24 inch
IP67 weatherproof portable	3		<ul> <li>Mountin (48 inch</li> </ul>
IP40 (NEMA 1) Energy Portable	4		• Mountin
Dedicated sensor mounting hardware			(60 inch
Sensor mounting tracks (aluminium with mounting straps) for pipes < 125 mm (5 inch)			<ul> <li>Mountin (84 inch</li> </ul>
<ul> <li>Universal sensor size A or B</li> </ul>	0 M A	0 0	<ul> <li>Mountin</li> <li>(120 inc</li> </ul>
<ul> <li>High precision sensor size A or B</li> </ul>	0 M E	0 0	Stainless
Sensor mounting frames for			991 sens
<ul> <li>Universal sensor size B (for pipes &gt; 125 mm (5 inch)</li> </ul>	CQO:1012FN-PB		• Size 1 h
<ul> <li>Universal sensor size C</li> </ul>	0 M C	0 0	• Size 2 h
<ul> <li>Universal sensor size D</li> </ul>	0 M C	0 1	• Size 3 h
Universal sensor size E	0 M C	0 2	• Size 4 h
<ul> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> </ul>	CQO:1012FNH-PI	3	Clamp-on cated sys
High precision sensor size C	0 M O	0 0	<ul> <li>RTD mo system:</li> </ul>
High precision sensor size D	0 M C	0 1	• RTD mo
Mounting straps for mounting frames (slotted stainless steel)			system: • RTD mo
• For pipes from DN 50 to DN 150	0 S N	100	system:
• For pipes from DN 50 to DN 300	0 S N	110	• RTD mo
• For pipes from DN 300 to DN 600	0 S N	120	system:
For pipes from DN 600 to DN 1200	0 S N	130	• Junction
• For pipes from DN 1200 to DN 1500	0 S N	140	Portable
• For pipes from DN 1500 to DN 2100	0 S N	150	Sensor m (aluminun
• For pipes from DN 2100 to DN 3000	0 S N	160	125 mm (
Spacer bars (for indexing sensors on pipe)			<ul> <li>Universa</li> </ul>
<ul> <li>Spacer bars for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas)</li> </ul>	0 M S	1 0	<ul> <li>High presented</li> <li>Sensor me</li> </ul>
<ul> <li>Spacer bars for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas)</li> </ul>	0 M S	2 0	• Universation (5 inch)
• Spacer bars for pipes to 800 mm/32 inch (liquid)	0 M S	3 0	• Universa
• Spacer bars for pipes to 1200 mm/48 inch	0 M S	4 0	• Universa
(liquid)			• Universa
Only use in conjunction with 7ME3960-0MS30			<ul> <li>High pre</li> <li>125 m</li> </ul>
High precision mounting enclosures for liquid and gas sensors			• High pre
• Stainless steel mounts for high precision size "C" sensors, single Enclosure	0 W S	5 0	• High pre
Stainless steel mounts for high precision size "D/E" sensors, single Enclosure	0 W S	6 0	Spacer ba
• Stainless steel mounts for high precision size "C" sensors, dual Enclosure	0 WE	5 0	
• Stainless steel mounts for high precision size "D/E" sensors, dual enclosure	0 W E	6 0	

Stranks F US clamp-on Stainless steel straps for weld seal enclosures mounting (2 x required for dual enclosures)  • Mounting strap for pipe diameter to 300 mm (13 inch)  • Mounting strap for pipe diameter to 1200 mm (24 inch)  • Mounting strap for pipe diameter to 1200 mm (68 inch)  • Mounting strap for pipe diameter to 1500 mm (60 inch)  • Mounting strap for pipe diameter to 2130 mm (84 inch)  • Mounting strap for pipe diameter to 2130 mm (84 inch)  • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps  • Size 1 high temp sensor pair  • Size 2 high temp sensor pair  • Size 3 high temp sensor pair  • Size 4 high temp sensor pair  • Size 4 high temp sensor pair  • Size 4 high temp sensor pair  • Size 610 mm (6 to 24 inch)  • RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)  • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (6 inch) for  • Universal sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes > 125 mm (5 inch)  • Universal sensor size C  • Universal sensor size C  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (6 inch)  • High precision sensor size C  • High precision sensor size D  • High precision sensor size D  • High precision sensor size C  • High precision sensor size D  • High precision	Selection and Ordering data	Article No.
Stainless steel straps for weld seal enclosure mounting (2 x required for dual enclosures)  • Mounting strap for pipe diameter to 300 mm (13 inch)  • Mounting strap for pipe diameter to 1200 mm (24 inch)  • Mounting strap for pipe diameter to 1200 mm (84 inch)  • Mounting strap for pipe diameter to 1500 mm (60 inch)  • Mounting strap for pipe diameter to 2130 mm (84 inch)  • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps  • Size 1 high temp sensor pair  • Size 2 high temp sensor pair  • Size 3 high temp sensor pair  • Size 4 high temp sensor pair  • Size 4 high temp sensor pair  • RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)  • RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)  • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch)  • Universal sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes > 125 mm (5 inch)  • Universal sensor size C  • Universal sensor size C  • Universal sensor size E  • High precision sensor size C	Spare parts (Miscellaneous)	
• Mounting strap for pipe diameter to 300 mm (13 inch) • Mounting strap for pipe diameter to 600 mm (24 inch) • Mounting strap for pipe diameter to 1200 mm (48 inch) • Mounting strap for pipe diameter to 1200 mm (60 inch) • Mounting strap for pipe diameter to 1500 mm (60 inch) • Mounting strap for pipe diameter to 2130 mm (84 inch) • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • Size 6 high temp sensor pair • Size 7 high temp sensor pair • Size 8 high temp sensor pair • Size 9 high temp sensor pair • Size 1 high temp sensor pair • Size 1 high temp sensor pair • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 6 high temp sensor pair • Size 1 high temp sensor pair • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 6 high temp sensor pair • Size 1 high temp sensor pair • Outpress 1 high temp sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size C • High precision sensor size C • High precision sensor size D	SITRANS F US clamp-on	7ME 3 9 6 0 -
• Mounting strap for pipe diameter to 600 mm (24 inch) • Mounting strap for pipe diameter to 1200 mm (48 inch) • Mounting strap for pipe diameter to 1500 mm (60 inch) • Mounting strap for pipe diameter to 2130 mm (84 inch) • Mounting strap for pipe diameter to 2130 mm (84 inch) • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • CQO:992MTNHMSH-1 Clamp-on RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) • RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) • Junction box for clamp on RTD's  Portable sensor mounting hardware Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for • Universal sensor size A or B • High precision sensor size B (for pipes > 125 mm (5 inch) • Universal sensor size B (for pipes > 125 mm (5 inch) • Universal sensor size C • Universal sensor size C • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size C • High precision sensor size D • High precision sensor size D		
• Mounting strap for pipe diameter to 1200 mm (48 inch) • Mounting strap for pipe diameter to 1500 mm (60 inch) • Mounting strap for pipe diameter to 2130 mm (84 inch) • Mounting strap for pipe diameter to 2130 mm (84 inch) • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • RTD mounting hardware for dedicated systems • RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) • RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch) • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for • Universal sensor size A or B • High precision sensor size A or B • High precision sensor size B (for pipes > 125 mm (5 inch) • Universal sensor size C • Universal sensor size C • Universal sensor size B • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size C		0 S M 0 1
• Mounting strap for pipe diameter to 1500 mm (60 inch)  • Mounting strap for pipe diameter to 2130 mm (84 inch)  • Mounting strap for pipe diameter to 2130 mm (84 inch)  • Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps  • Size 1 high temp sensor pair  • Size 2 high temp sensor pair  • Size 3 high temp sensor pair  • Size 4 high temp sensor pair  • Size 5 high temp sensor pair  • Size 6 high temp sensor pair  • Size 8 high temp sensor pair  • Size 9 high temp sensor pair  • Size 1 high temp sensor pair  • Size 1 high temp sensor pair  • Size 2 high temp sensor pair  • CQO:992MTNHMSH-1  • CQO:992MTNHMSH-3  • CQO:992MTNHMSH-4  • CQO:992MTNHMSH-4  • OMR 0 0  • System: 12.7 to 50.8 mm (0.5 to 2 inch)  • RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)  • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  • Junction box for clamp on RTD's  Portable sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes > 125 mm (5 inch)  • Universal sensor size C  • Universal sensor size B  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size D		0 S M 1 1
Mounting strap for pipe diameter to 2130 mm (84 inch)   Mounting strap for pipe diameter to 3050 mm (120 inch)   Stainless mounting tracks for high temp 991 sensors, with straps   Size 1 high temp sensor pair     Size 2 high temp sensor pair     Size 3 high temp sensor pair     Size 4 high temp sensor pair     Size 4 high temp sensor pair     Size 4 high temp sensor pair     CQO:992MTNHMSH-1     CQO:992MTNHMSH-3     CQO:992MTNHMSH-3     CQO:992MTNHMSH-4     CQO:992MTNHMSH-4     CQO:992MTNHMSH-4     CQO:992MTNHMSH-4     CQO:992MTNHMSH-5     CQO:992MTNHMSH-6     CQO:992MTNHMSH-6     CQO:992MTNHMSH-7     CQO:992MTNHMSH-7     CQO:992MTNHMSH-8     CQO:992MTNHMSH-9     CQO:992MTNHMSH-9     OMR 0 0     OMR 0 1     STD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)     RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)     Junction box for clamp on RTD's     Portable sensor mounting hardware     Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for     Universal sensor size A or B     Sensor mounting frames     Universal sensor size B (for pipes > 125 mm (5 inch)     Universal sensor size C     Universal sensor size B (for pipes > 125 mm (5 inch)     Universal sensor size B (for pipes > 125 mm (5 inch)     High precision sensor size B (for pipes > 125 mm (5 inch)     High precision sensor size C     High precision sensor size D		0 S M 2 1
• Mounting strap for pipe diameter to 3050 mm (120 inch)  Stainless mounting tracks for high temp 991 sensors, with straps  • Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • CQO:992MTNHMSH-3 • CQO:992MTNHMSH-3 • CQO:992MTNHMSH-4  CQO:992MTNHMSH-3 • CQO:992MTNHMSH-4  • RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch) • RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch) • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (alurninum with mounting chains) for pipes < 125 mm (5 inch) for • Universal sensor size A or B • High precision sensor size B (for pipes > 125 mm (5 inch) • Universal sensor size C • Universal sensor size E • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size C • High precision sensor size D		0 S M 3 1
Stainless mounting tracks for high temp 991 sensors, with straps  Size 1 high temp sensor pair Size 2 high temp sensor pair Size 3 high temp sensor pair CQO:992MTNHMSH-2 Clamp-on RTD mounting hardware for dedicated systems RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch) RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) Junction box for clamp on RTD's  Portable sensor mounting hardware Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for Universal sensor size A or B High precision sensor size B (for pipes > 125 mm (5 inch) Universal sensor size D High precision sensor size B (for pipes > 125 mm (5 inch) High precision sensor size C High precision sensor size D  MR 0 2  CQO:992ECJ  CQO:992ECJ		0 S M 4 1
• Size 1 high temp sensor pair • Size 2 high temp sensor pair • Size 2 high temp sensor pair • Size 3 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • Size 4 high temp sensor pair • Clamp-on RTD mounting hardware for dedicated systems • RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) • RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch) • RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch) • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for • Universal sensor size A or B  Sensor mounting frames • Universal sensor size B (for pipes > 125 mm (5 inch) • Universal sensor size C • Universal sensor size E • High precision sensor size B (for pipes > 125 mm (5 inch) • High precision sensor size C • High precision sensor size D		0 S M 5 1
<ul> <li>Size 2 high temp sensor pair</li> <li>Size 3 high temp sensor pair</li> <li>Size 4 high temp sensor pair</li> <li>CQO:992MTNHMSH-3</li> <li>CQO:992MTNHMSH-4</li> <li>Clamp-on RTD mounting hardware for dedicated systems</li> <li>RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)</li> <li>RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)</li> <li>RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)</li> <li>RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)</li> <li>Junction box for clamp on RTD's</li> <li>Portable sensor mounting hardware</li> <li>Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes &lt; 125 mm (5 inch) for</li> <li>Universal sensor size A or B</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>Universal sensor size D</li> <li>Universal sensor size D</li> <li>Universal sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size D</li> </ul>		
Size 3 high temp sensor pair Size 4 high temp sensor pair Clamp-on RTD mounting hardware for dedicated systems RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch) RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch) RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch) RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch) Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for Universal sensor size A or B High precision sensor size A or B Sensor mounting frames Universal sensor size B (for pipes > 125 mm (5 inch) Universal sensor size C High precision sensor size B (for pipes > 125 mm (5 inch) High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size D  MC QO:1012FP-PB	Size 1 high temp sensor pair	CQO:992MTNHMSH-1
Size 4 high temp sensor pair  Clamp-on RTD mounting hardware for dedicated systems  RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)  RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)  RTD mounting hardware for dedicated system: 21.8 to 203.2 mm (1.25 to 8 inch)  RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  Universal sensor size A or B  Sensor mounting frames  Universal sensor size B (for pipes >125 mm (5 inch)  Universal sensor size C  Universal sensor size D  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size C  High precision sensor size D  High precision sensor size C  High precision sensor size D  MR 0 0  MR 0 1  CQO:992ECJ  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  AMC 0 0  AMC	<ul> <li>Size 2 high temp sensor pair</li> </ul>	CQO:992MTNHMSH-2
Clamp-on RTD mounting hardware for dedicated systems  RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)  RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)  RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)  RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  Universal sensor size A or B  Sensor mounting frames  Universal sensor size B (for pipes >125 mm (5 inch)  Universal sensor size C  Universal sensor size C  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size C  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size D  High precision sensor size C  High precision sensor size C  High precision sensor size D  MR 0 0  MR 0 1  CQO:992ECJ  CQO:992ECJ  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB  CQO:1012FP-PB	<ul> <li>Size 3 high temp sensor pair</li> </ul>	CQO:992MTNHMSH-3
• RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)  • RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)  • RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)  • RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch)  • Universal sensor size C  • Universal sensor size C  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size D  • High precision sensor size C  • High precision sensor size D	<ul> <li>Size 4 high temp sensor pair</li> </ul>	CQO:992MTNHMSH-4
system: 152 to 610 mm (6 to 24 inch)  RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)  RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)  RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  Universal sensor size A or B  Sensor mounting frames  Universal sensor size B (for pipes >125 mm (5 inch)  Universal sensor size C  Universal sensor size D  High precision sensor size B (for pipes > 125 mm (5 inch)  Universal sensor size C  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size C  High precision sensor size D  High precision sensor size C  High precision sensor size D  MR 0 1  CQO:992ECJ  CQO:992ECJ		
system: 12.7 to 50.8 mm (0.5 to 2 inch)  RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)  RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  Universal sensor size A or B  Sensor mounting frames  Universal sensor size B (for pipes >125 mm (5 inch)  Universal sensor size C  Universal sensor size D  High precision sensor size B (for pipes > 125 mm (5 inch)  Universal sensor size C  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size D  MR 0 2  CQO:992ECJ  CQO:992ECJ  CQO:992ECJ  CQO:992ECJ		0 MR 0 0
system: 31.8 to 203.2 mm (1.25 to 8 inch)  RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)  Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  Universal sensor size A or B  Sensor mounting frames  Universal sensor size B (for pipes >125 mm (5 inch)  Universal sensor size C  Universal sensor size D  High precision sensor size B (for pipes > 125 mm (5 inch)  Universal sensor size C  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size B (for pipes > 125 mm (5 inch)  High precision sensor size D  MR 0 4  CQO:992ECJ  CQO:992ECJ  CQO:992ECJ  CQO:992ECJ  CQO:992ECJ		0 MR 0 1
system: 508 to 1219 mm (20 to 48 inch)  • Junction box for clamp on RTD's  Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size B  • High precision sensor size B (for pipes > 125 mm (5 inch)  • Universal sensor size C  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size D		0 MR 0 2
Portable sensor mounting hardware  Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  • High precision sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size D  3 MD 0 0  3 MD 0 1		0 MR 0 4
Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  • High precision sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch))  • Universal sensor size C  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch))  • High precision sensor size C  • High precision sensor size D	<ul> <li>Junction box for clamp on RTD's</li> </ul>	CQO:992ECJ
(aluminum with mounting chains) for pipes < 125 mm (5 inch) for  • Universal sensor size A or B  • High precision sensor size A or B  Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size C  • High precision sensor size D  3 MD 0 0  3 MD 0 1	Portable sensor mounting hardware	
<ul> <li>High precision sensor size A or B Sensor mounting frames</li> <li>Universal sensor size B (for pipes &gt;125 mm (5 inch)</li> <li>Universal sensor size C</li> <li>Universal sensor size D</li> <li>Universal sensor size E</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size C</li> <li>High precision sensor size C</li> <li>High precision sensor size D</li> <li>3MD 0 0</li> <li>3MD 0 1</li> </ul>	(aluminum with mounting chains) for pipes <	
Sensor mounting frames  • Universal sensor size B (for pipes >125 mm (5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size D  3 MD 0 0  3 MD 0 1	<ul> <li>Universal sensor size A or B</li> </ul>	3 M A 0 0
<ul> <li>Universal sensor size B (for pipes &gt;125 mm (5 inch)</li> <li>Universal sensor size C</li> <li>Universal sensor size D</li> <li>Universal sensor size D</li> <li>Universal sensor size E</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size C</li> <li>High precision sensor size D</li> <li>3 MD 0 0</li> <li>3 MD 0 1</li> </ul>	<ul> <li>High precision sensor size A or B</li> </ul>	3MB00
(5 inch)  • Universal sensor size C  • Universal sensor size D  • Universal sensor size E  • High precision sensor size B (for pipes > 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size D  3 MC 0 1  3 MC 0 2  CQO:1012FPH-PB  3 MD 0 0  3 MD 0 0	Sensor mounting frames	
<ul> <li>Universal sensor size D</li> <li>Universal sensor size E</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size C</li> <li>High precision sensor size D</li> <li>3 MC 0 1</li> <li>CQO:1012FPH-PB</li> <li>3 MD 0 0</li> <li>3 MD 0 1</li> </ul>		CQO:1012FP-PB
<ul> <li>Universal sensor size E</li> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size C</li> <li>High precision sensor size D</li> <li>3 MC 0 2</li> <li>CQO:1012FPH-PB</li> <li>3 MD 0 0</li> <li>3 MD 0 1</li> </ul>	<ul> <li>Universal sensor size C</li> </ul>	3 M C 0 0
<ul> <li>High precision sensor size B (for pipes &gt; 125 mm (5 inch)</li> <li>High precision sensor size C</li> <li>High precision sensor size D</li> <li>3 MD 0 0</li> <li>3 MD 0 1</li> </ul>	<ul> <li>Universal sensor size D</li> </ul>	3 M C 0 1
> 125 mm (5 inch)  • High precision sensor size C  • High precision sensor size D  3 MD 0 1	<ul> <li>Universal sensor size E</li> </ul>	3 M C 0 2
• High precision sensor size D 3 MD 0 1		CQO:1012FPH-PB
	High precision sensor size C	3 M D 0 0
Spacer bar (for indexing portable sensors 3 MS 0 0	High precision sensor size D	3 M D 0 1
	Spacer bar (for indexing portable sensors	3 M S 0 0

SITRANS F US Clamp-on

Selection and Ordering data	Article No.		
Spare parts (Miscellaneous)			
SITRANS F US clamp-on	7ME 3 9 6 0 -		
Mounting chain and EZ clamp hardware			
EZ clamp hardware set for DN 25 to DN 600 (1 to 24 inch); handles all trans- ducers except "D" size HP and "E" size univ.	CQO:1012Z-1		
<ul> <li>EZ clamp hardware set for DN 25 to DN 600 (1 to 24 inch) for "D" size HP and "E" size universal</li> </ul>	CQO:1012Z-2		
<ul> <li>Mounting chain for portable sensors: 4 x 760 mm lengths</li> </ul>	3 CM 1 0		
<ul> <li>Mounting chain for portable sensors: 2 x 760 mm and 2 x 1500 mm lengths</li> </ul>	3 C M 2 0		
RTD mounting hardware for portable system	3 M R 0 0		
Sensor connector adaptors			
<ul> <li>"F" connector to BNC adapter (order 2 per sensor set)</li> </ul>	CQO:1012NFPA		

# **Flow Measurement** SITRANS F US Clamp-on

# **Accessories/Spare parts**

Selection and Ordering data	Article No.		Selection and Ordering data	Article No.	
Spare parts (Miscellaneous)			Spare parts (Miscellaneous)		
SITRANS F US clamp-on	7ME3960-		SITRANS F US clamp-on	7ME 3 9 6 0	-
Insert RTD Thermowells			Ultrasonic couplants		
<ul> <li>Thermowell std. duty uninsulated pipe 140 mm (5.5 inch)</li> </ul>	CQO:1012TV	V-1	• Temporary water based for portable systems: 350 ml (12 oz): -34 +38 °C (-30 +100 °F)		0 U C 1 0
<ul> <li>Thermowell std. duty uninsulated pipe 216 mm (8.5 inch)</li> </ul>	CQO:1012TV	V-2	<ul> <li>Permanent synthetic polymer based: 90 ml (3 oz) -40 +190 °C (-40 +375 °F)</li> </ul>		0 U C 2 0
<ul> <li>Thermowell std. duty uninsulated pipe 292 mm (11.5 inch)</li> </ul>	CQO:1012TV	V-3	<ul> <li>Permanent high temp fluoroether:</li> <li>-40 +230 °C (-40 +450 °F)</li> </ul>		0 U C 3 0
<ul> <li>Thermowell std. duty with lagging 140 mm (5.5 inch)</li> </ul>	CQO:1012TV	V-1L	<ul> <li>Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40+120 °C</li> </ul>	CQO:CC112	!
<ul> <li>Thermowell std. duty with lagging 216 mm (8.5 inch)</li> </ul>	CQO:1012TV	V-2L	(-40+250 °F) • Permanent high temp silicone grease: 12 ml	CQO:CC117	,
<ul> <li>Thermowell std. duty with lagging 292 mm (11.5 inch)</li> </ul>	CQO:1012TV	V-3L	(0.4 oz): -40 +230 °C (-40 +450 °F) • Permanent high temp silicone grease: 150 ml	CQO:CC117	Ά
Sensor cables for	_		(5 oz): -40 +230 °C (-40 +450 °F)		
(Use "Sensor cable selection chart" to complete Article No. with ##)			Couplant for submersible sensor applications	CQO:CC120	
IP65 (NEMA 4X) wall mount or IP 66 (NEMA 7) wall mount explosionproof		0 C K # #	<ul> <li>Dry coupling pads (qty of 10):</li> <li>-34 to +200 °C (-30 to +392 °F)</li> </ul>		0 U C 4 0
• IP65 (NEMA 7) compact explosion proof		2 C K # #	Pipe damping films for SITRANS FUG gas systems (For one pair of sensors)		
• IP67 Weatherproof portable		3 C K # #	• B1, B2, B3, C1 and C2 sensors		0 DM 1 0
• IP40 (NEMA 1) Portable		4 C K # #	• D1 and D3 sensors		0 DM 2 0
RTD cables for	_		• D2 sensor		0 DM 3 0
(Use "Sensor cable selection chart" to complete Article No. with ##)			• D4 sensor		0 DM 4 0
All dedicated systems		0 C R # #	Serial RS 232 Cables and I/O Adapters		
IP67 Weatherproof portable		3 C R # #	<ul> <li>RS 232 Cable for all dedicated meters except FST020</li> </ul>		0 C S 0 0
• IP40 (NEMA 1) Portable		4 C R # #	RS 232 Cable for IP66 weatherproof		3 C S 0 0
Dedicated cable termination kits			portable meter		
Standard, plenum and armored sensor cable (NEMA 4X wall mount and NEMA 7 wall		0 C T 0 1	<ul> <li>RS 232 Cable for FUP1010 IP40 Portable meter and FST020</li> </ul>		4 C S 0 0
mount explosionproof)  • Submersible sensor cable (NEMA 4X wall		0 C T 1 1	<ul> <li>I/O adapter for IP66 Weatherproof portable meter</li> </ul>		3 A D 0 0
mount and NEMA 7 wall mount explosion- proof)		00111	Universal Sensor Test Blocks	_	
Standard and plenum sensor cable		1 C T 0 1	• Test block for size A and B universal sensors		0 T B 1 0
(SITRANS FST020)			• Test block for size C and D universal sensors		0 T B 2 0
<ul> <li>Standard, plenum and armored sensor cable (NEMA 7 compact explosionproof)</li> </ul>		2 C T 0 1	Field Manuals  • CD with documentation for SITRANS F US	A5E0283066	S4-03
Submersible sensor cable (NEMA 7 compact explosionproof)		2 C T 1 1	Clamp-on ultrasonic flowmeters (English)	AJEU203000	7-00
Clamp-on RTD cable termination kit for standard RTD		0 C T 2 1			
Clamp-on RTD cable termination kit for sub- mersible RTD		0 C T 3 1			

0 C T 4 1

A5E32834162

• Insert RTD cable termination kit **Cable gland kit** for IP65 NEMA 4X enclosures

SITRANS F US Clamp-on

#### **Accessories/Spare parts**

#### Sensor cable selection chart (Dedicated, pair)

Sensor c	Sensor cable codes for length and type options					
Cable	Standard	Submersible	Plenum	Armored		
length m (ft)		-40 +80 °C (-40 +176 °F)		-40 +80 °C (-40 +176 °F)		
	Order code					
6 (20)	K01	K11	K21	K31		
15 (50)	K02	K12	K22	K32		
30 (100)	K03	K13	K23	K33		
46 (150)	K04	K14	K24	K34		
61 (200)	K05	K15	K25	K35		
91 (300)	K06	K16	K26	K36		

# Sensor cable selection chart (SITRANS FUP1010, FUE1010 Portable, pair)

Sensor cable codes for length and type options			
Cable length m (ft)	Standard Plenum -40 + 80 °C -40 + 200 °C (-40 +176 °F) (-40 +392 °F)		
	Order Code		
6 (20)	K01	K21	
15 (50)	K02	K22	
30 (100)	K03	K23	

#### RTD cable selection chart (Dedicated, each)

RTD cabl	RTD cable codes for length and type					
Cable length m (ft)	Standard	Submersible	for insert RTD	for submer- sible insert RTD		
			-40 +200 °C (-40 +392 °F)			
	Order code					
6 (20)	R01	R11	R21	R31		
15 (50)	R02	R12	R22	R32		
30 (100)	R03	R13	R23	R33		
46 (150)	R04	R14	R24	R34		
61 (200)	R05	R15	R25	R35		
91 (300)	R06	R16	R26	R36		

#### RTD cable selection chart

RTD cable codes for length and type options			
Cable length m (ft)	IP67, FUP1010 IP40, FUE1010 -40 + 200 °C -40 + 200 °C (-40 +392 °F) (-40 +392 °F)		
	Order Code		
6 (20)	R11	R01	
15 (50)	R12	R02	
30 (100)	R13	R03	

# Flow Measurement SITRANS F X

#### **SITRANS FX300**

#### Overview



SITRANS F X vortex flowmeters provide accurate volumetric and mass flow measurement of steam, gases and liquids as an all-in-one solution with integrated temperature and pressure compensation.

#### Benefits

- 2-wire technology with HART communication
- Integrated temperature compensation for saturated steam as standard feature
- Integrated temperature and pressure compensation enabling direct measurement of mass, standard volume flow rate and energy
- One instrument for measuring pressure, temperature and flow.
   No additional installation of pressure and temperature sensors
- Maximum process reliability thanks to Intelligent Signal Processing (ISP) stable readings, free of external disturbances
- Fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- · Maintenance-free design
- Ready to use due to plug & play feature
- Minimal pressure drop
- Compact or remote design
- Free Air Delivery (FAD) measurement of a compressor

#### Application

The SITRANS FX300 is a flowmeter in a single or dual transmitter version, suitable for measuring industrial steam, gases, as well as conductive and non-conductive liquids, e.g. steam (saturated steam, superheated steam), industrial gases (compressed air, nitrogen, liquefied gases, flue gases), and conductive and non-conductive liquids (demineralized water, boiler feed water, solvents, heat transfer oil).

The main applications of SITRANS FX300 can be found in the following sectors:

- Chemical
- Petrochemical
- Oil & Gas
- Power plants
  - Air
  - Heating
  - Cooling
  - Chilling
- Food & beverage
  - Pharmaceutical
  - Sugar refineries
  - Dairies
  - Breweries
  - Production of soft drinks
- Pulp & paper
- · Water & waste water

#### System Overview

Version	Flange	Sandwich	Dual transmitter
Compact			
Remote			

#### Design

SITRANS FX300 vortex flowmeters are available in the following variants:

#### SITRANS FX300 Single transmitter

The single transmitter variant exists in flange or sandwich design. In flange design the SITRANS FX300 offers a sensor with integrated nominal diameter reduction up to two nominal diameter sizes. That ensures best results in accuracy and optimal measuring ranges even in pipelines with large diameters, designed for low pressure loss. By forgoing complex pipeline reduction installations, space and cost saving installations can be realized. At the same time the number of potential leakages is reduced to a minimum.

The flowmeters in sandwich design will be supplied with additional optimised centring rings. With installation of the centring rings the SITRANS FX300 can be aligned centrically and eliminates any offset between the sensor and the pipeline.

The SITRANS FX300 is also available as a remote version. This feature allows separating the transmitter from the sensor up to a distance of 15m (49 ft). The remote mounted transmitter allows easy operation and optimal readability.

#### SITRANS F X

#### **SITRANS FX300**

The following configurations can be selected for the single transmitter variant:

#### Basic version

Suitable for liquids and gases, integrated temperature compensation included as standard for saturated steam

#### With integrated pressure compensation

Version with integrated temperature and pressure compensation for gases, wet gases, gas mixtures or steam (energy measurement optional)

With integrated pressure compensation and isolation valve Allowing the pressure sensor to be shut off for the purpose of pressure and leak testing of the pipeline or for being exchanged without interrupting the process.

#### Remote version

With this version transmitter and sensor are locally seperated. In addition, it offers the same the features as the compact version (integrated temperature and pressure compensation, isolation valve).

#### SITRANS FX300 Dual transmitter

This is a genuine redundant system with two independent sensors and transmitters providing twofold functional reliability and availability of the measurement. This variant is optimally suited for measurements in multi-product pipelines.

The dual transmitter version is available as:

#### Basic version

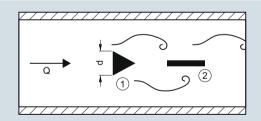
Suitable for liquids and gases, temperature compensation integrated as standard for saturated steam

#### Function

#### Operating Principle

SITRANS F X vortex flowmeters measure flow rate by detecting the frequency at which alternating vortices are shed from a bluff body inserted into the flow stream. This principle of measurement is derived from the Karman phenomenon of vortex shedding. The frequency of the alternating vortices is proportional to the flow rate.

The passage of a vortex causes a slight stress on a pick-up sensor placed downstream of the bluff body. The stress is detected by piezo-electric crystals placed inside the pick-up sensor.



(1) = Bluff Body, (2) = Pick-up

The flowmeter calculates the flow velocity using the following equation:

$$Q = A \cdot V = A \cdot d / St \cdot f = 101.93 \cdot f / K [m3/h]$$

#### Where:

Q = flow rate [m<sup>3</sup>/h]

f = vortex shedding frequency [Hz]

K = calibration constant [pulses/m<sup>3</sup>]

d = width of the bluff body [m]

St = Strouhal Number

A = cross-section area [m<sup>2</sup>]

V = flow velocity [m/s]

#### Requirements

Innut

In order to generate the vortex streets, the medium must have a minimum velocity:

- For steam and gases, the flow velocity must be 2 to 80 m/s (6.6 to 262 ft/s)
- For liquids the flow velocity must be 0.4 to 10 m/s (1.3 to 32.8 ft/s)

#### Technical specifications

See "Dimensional Drawings"
1 100 bar (14.5 1450 psi) (Higher pressures on request)
4 20 mA
20.8 mA ± 1 % (105 % ± 1 %)
100 Ω
$R_{\text{max}} = (U_{\text{Power Supply}} - 14 \text{ V})/22 \text{ mA}$
NAMUR NE 43
22 mA (112.5 %)
4 mA
HART
FSK
Transmitter

#### Pulse output

Passive pulse output, setting pulse value (meter factor) for totalized flow or heat quantity (energy) with option Y47 (e.g.: 1 pulse/kg or 1 pulse/kWh)

Max. 0.5 Hz Pulse frequency

Min. 24 V DC as NAMUR or Power supply

• Non-Ex version open < 1 mA, max. 36 V, closed 100 mA, *U* < 2 V

open < 1 mA, max. 30 V, Ex version closed 100 mA. *U* < 2 V

#### Accuracy

Standard version

• For liquids

- Re ≥ 20 000

• For steam and gases - Re ≥ 20 000

• For steam, gases and liquids

- 10 000 < Re < 20 000 ±2%

Pressure and temperaturecompensated version

For liquids

- 10 000 < Re < 20 000 ±2% - Re ≥ 20 000

 $\pm$  0.75 %

 $\pm 0.75 \%$ 

±1%

• For gases and steam

- 10 000 < Re < 20 000  $\pm$  2.5 % - Re ≥ 20 000 +15% Repeatability ± 0.1 %

#### Installation conditions

(At different conditions, e.g. installation after control valve, bends or reductions, please refer to the operating instructions.)

 Inlet run ≥ 20 x DN • Outlet run  $\geq$  5 x DN

# **Flow Measurement** SITRANS F X

# SITRANS FX300

			SITRANS FX300
Software		Design	
		Material	
Uncompensated for liquids and gases, density-compensated by temperature for saturated steam	Order option 1	• Sensor/Pick-up	AISI 316L (1.4404)/ AISI 316L (1.4435)
Density-compensated by temperature and pressure for superheated steam	Order option 4		Hastelloy C22/2.4602 available on request (contact your local Siemens representative)
Gross heat meter		Transmitter housing	Aluminum
When the thermal energy of steam is to be measured	Order option 5	<ul> <li>Sensor gaskets (Pick-up/Pressure sensor)</li> </ul>	AISI 316L (1.4435) / FPM or FFKM
Following information is required at option Y51 to Y56	Y51 Variable current output: Flow rate, power		FPM (Viton) for steam and non-aggressive gases.
	• Y52 Power unit Select one of the following units:		FFKM (Kalrez) for chlorine and other aggressive gases.
	kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom)		(The meter is fitted with FPM/FFKM gasket only when configured with pressure sensor)
	Y53 Fullscale value power	Dragge connections	,
	<ul> <li>Y54 Variable pulse output: Total- ized flow, energy</li> </ul>	Process connections	Flange norm EN 1092-1 form B1/B2 or ANSI B16.5 RF.
	<ul><li>Y55 Totalizer on/off</li><li>Y56 Energy unit</li></ul>		Other flanges on request (contact your local Siemens representative)
	Select one of the following units:	<ul> <li>Flange version</li> </ul>	DN 15 300 (½ 12")
	kJ, MJ, GJ, Btu th, kcal, kWh,	<ul> <li>Sandwich version</li> </ul>	DN 15 100 (½ 4")
B ::	MWh or special (custom).	Degree of protection	IP66/IP67
Density compensated by temperature and pressure for gases, wet	Order option /	Dimensions and weights	See "Dimensional Drawings"
gases		Display and operating interface	C
Wet gases	Select Y49 and enter relative humidity of process medium in %	Local display	2 lines, 10 characters per line
FAD - Free Air Delivery	manufaction process meanant in 70	Languages	German, English, French
When the delivered air of a com-	Order option 8	Power supply	
pressor is to be measured	Order option o	<ul> <li>Standard version</li> </ul>	14 36 V DC
In Y81 to Y87 add information	Y81 Inlet suction temperature	• Ex version	14 30 V DC
regarding:	Y82 Atmospheric pressure	Certificates and approvals	
	Y83 Pressure drop at inlet suction	Explosion protection	
	filter • Y84 Inlet relative humidity	• ATEX	II 2G EEx d ia [ia] IIC T6
	Y85 Actual compressor rotation	• FM US/C	Class I, II, III, Div. 1 and 2
	(rpm)  • Y86 Rated compressor rotation	Calibration	All flowmeters will be delivered with a 3 point calibration certificate
	(rpm)  • Y87 Relative humidity at compressor output	Material Certificate	Certificate of compliance, pressure test, material certificate, material in acc. of NACE and PMI of pressure bearing metal parts.
Mixed gases	When fluid is a gas mixture, specifiy the single gas components and their amount/concentration in %.	Cleaning	Choose Cleaning Class1 when fluid is oxygen or contains chloride.
Rated operation conditions		Certificates	X-ray and dye penetration test on
Ambient temperature			pressure bearing weldings
Non-Ex version	-40 +85 °C (-40 +185 °F)		
• Ex version	-40 +65 °C (-40 +149 °F)		
Storage temperature	-50 +85 °C (-58 +185 °F)		
Media temperature	-40 +240 °C (-40 +464 °F)		
Density	Taken into consideration when dimensioning		
\ /:	40 -D		

<10 cP

10 000 ... 2 300 000

Max. 100 bar (1450 psi) Higher pressure on request (contact your local Siemens representative)

Viscosity Reynolds number

Media pressure limit

SITRANS F X

# SITRANS FX300

Valid combinations of sensor/connections size with flange norm/nominal pressure are shown in the following table.

Sensor size	Connection size langed - Single transn	L EN 1092-1, Form B1/B2, PN 10	EN 1092-1, Form B1/B2, PN 16	EN 1092-1, Form B1/B2, PN 25	EN 1092-1, Form B1/B2, PN 40	EN 1092-1, Form B1/B2, PN 63	EN 1092-1, Form B1/B2, PN 100	ANSI B16.5, class 150	ANSI B16.5, class 300	ANSI B16.5, class 600
DN 15										
2.1.10	DN 25	_	_	_	•	_	•	•	•	•
	DN 40	-	-	_	•		•	•	•	•
DN 25	DN 25	-	-	-	•	-	•	•	•	•
	DN 40	-	-	-	•	-	•	•	•	•
	DN 50	-	•	-	•	•	•	•	•	•
DN 40	DN 40	-	-	-	•	-	•	•	•	•
	DN 50	-	•	-	•	•	•	•	•	•
	DN 80	-	•	-	•	•	•	•	•	•
DN 50	DN 50	-	•	-	•	•	•	•	•	•
	DN 80	-	•	-	•	•	•	•	•	•
	DN 100	-	•	-	•	•	•	•	•	•
DN 80	DN 80	-	•	-	•	•	•	•	•	•
	DN 100	-	•	-	•	•	•	•	•	•
	DN 150	-	•	-	•	•	•	•	•	•
DN 100	DN 100	-	•	-	•	•	•	•	•	•
	DN 150	-	•	-	•	•	•	•	•	•
	DN 200	•	•	•	•	-	-	•	•	-
DN 150	DN 150	-	•	-	•	•	•	•	•	•
	DN 200	•	•	•	•	-	-	•	•	-
	DN 250	•	•	•	•	-	-	•	•	-
DN 200	DN 200	•	•	•	•	-	-	•	•	-
	DN 250	•	•	•	•	-	-	•	•	-
	DN 300	•	•	•	•	-	-	•	•	-
DN 250	DN 250	•	•	•	•	-	-	•	•	-
	DN 300	•	•	•	•	-	-	•	•	-
DN 300	DN 300	•	•	•	•	-	-	•	•	-
<ul> <li>available</li> </ul>										

availablenot available

# Flow Measurement SITRANS F X

# SITRANS FX300

Selection and Orc SITRANS FX300 F Single transmitter T <sub>max</sub> = 240 °C (464	Flanged r and	Article No. Ord. code  7 ME 2 6 0 0 -
Click on the Artification in the	cle No. for the online con- PIA Life Cycle Portal.	
Sensor size DN 15 (½")	Connection size DN 15 (½") DN 25 (1") DN 40 (1½")	1 A 1 B 1 C
DN 25 (1")	DN 25 (1") DN 40 (1½") DN 50 (2")	2 B 2 C 2 D
DN 40 (1½")	DN 40 (1½") DN 50 (2") DN 80 (3")	2 K 2 L 2 M
DN 50 (2")	DN 50 (2") DN 80 (3") DN 100 (4")	2 R 2 S 2 T
DN 80 (3")	DN 80 (3") DN 100 (4") DN 150 (6")	3 L 3 M 3 R
DN 100 (4")	DN 100 (4") DN 150 (6") DN 200 (8")	3 S 3 T 3 Q
DN 150 (6")	DN 150 (6") DN 200 (8") DN 250 (10")	4 M 4 P 4 Q
DN 200 (8")	DN 200 (8") DN 250 (10") DN 300 (12")	4 T 4 U 4 V
DN 250 (10")	DN 250 (10") DN 300 (12")	4 W 4 Y
DN 300 (12")	DN 300 (12")	5 E
Flange norm and Form B1/B2 PN 10 PN 16 PN 25	nominal pressure EN 1092-1 DN 200 300 DN 50 300 DN 200 300	A B C
PN 40 PN 63 PN 100 <b>RF</b>	DN 15 300 DN 50 150 DN 15 150 <b>ANSI B16.5</b>	D E F
class 150 class 300 class 600	½ 12" ½ 12" ½ 6"	J K L
Sensor material/G St. steel AISI 316L ( (1.4435)/ FPM St. steel AISI 316L ( (1.4435)/ FFKM	1.4404)/AISI 316L	1 5
Transmitter desig Compact version - Remote version: 5 m (16.4 ft) 10 m (32.8 ft) 15 m (49.2 ft)		1 2 3 4

Selection and Ordering data	Article No.	0	rd.	C	OC	le
SITRANS FX300 Flanged	7ME260	) -				
Single transmitter and T <sub>max</sub> = 240 °C (464 °F)			П			
Approval and cable gland			Н			
Non-Ex, M20 x 1.5		1				
Non-Ex, ½" NPT		2				
FM approval Class 1 Div. 2, M20 x 1.5		3				
ATEX, M20 x 1.5		1				
ATEX, 1/2" NPT		5				
FM approval Class 1 Div. 1, M20 x 1.5		3				
FM approval Class 1 Div. 1, 1/2" NPT		7				
FM approval Class 1 Div. 2, 1/2" NPT	1	3				
Further approvals and cable glands IEC Ex with M20 x 1.5					_	
IEC Ex with M20 x 1.5 IEC Ex with ½" NPT		9			0	
	_	,		IA	U	D
Transmitter, display and communication						
With display, HART	_	Α				
Pressure sensor and isolation valve						
Without pressure sensor		Α	١			
With pressure sensor, range:						
4 bar (58 psi) 6 bar (87 psi)		B D				
10 bar (145 psi)		E				
16 bar (232 psi)		G	1 1			
25 bar (363 psi)		Н				
40 bar (580 psi)		K				
60 bar (870 psi)		L				
100 bar (1450 psi)		N				
With isolation valve and pressure sensor,						
range:						
4 bar (58 psi)		P				
6 bar (87 psi)		G				
10 bar (145 psi) 16 bar (232 psi)		F S				
25 bar (363 psi)		U				
40 bar (580 psi)		V				
60 bar (870 psi)		W				
100 bar (1450 psi)		Υ				
Software	_		П			
Uncompensated for liquids and gases, den-			1			
sity compensated by temperature for satu-						
rated steam			Ш			
Density compensation for superheated steam			4			
Density compensated by temperature and			5			
pressure for superheated steam, gross heat			١			
meter - setting of energy metering at option						
Y51 Y56			إرا			
Density compensation for gases, wet gases and mixed gases - setting of relative humid-			7			
ity at option Y49						
Density compensation for gases, wet gases			8			
and mixed gases, Free air delivery (FAD) -						
setting of FAD at option Y81 Y87 and relative humidity at option Y49						
and harmanly at option 140			П			

# SITRANS F X

#### **SITRANS FX300**

Selection and Ordering data	Order code
<b>Additional information</b> Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	Y47
Relative humidity of process medium in %	Y49
Settings of gross heat	
Variable current output: Flow rate, power	Y51
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	Y52
Fullscale value power	Y53
Variable pulse output: Totalized flow, energy	Y54
Totalizer on/off	Y55
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	Y56
Settings of FAD	
Inlet suction temperature <sup>1)</sup>	Y81
Atmospheric pressure <sup>1)</sup>	Y82
Pressure drop at inlet suction filter <sup>2)</sup>	Y83
Inlet relative humidity <sup>1)</sup>	Y84
Actual compressor rotation (rpm) <sup>2)</sup>	Y85
Rated compressor rotation (rpm) <sup>2)</sup>	Y86
Relative humidity at compressor outlet <sup>2)</sup>	Y87

#### Operating instructions

Description	Article No.
English	A5E2100423

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	A10
Material certificate	
Certificate of compliance EN 10204-2.1	C10
Pressure test + 3.1 accordance EN 10204	C11
Material certificate of pressure bearing parts + certificate 3.1	C12
Material in accordance with NACE MR 0175-01	C13
PMI of pressure bearing metal parts + certificate 3.1	C14
Material certificate of pressure bearing parts + PMI + certificate 3.1	C15
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	D11
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	H30
Cleaning	
Cleaning class 1	K46
Cleaning class 1 + certificate 3.1 acc. EN 10204	K48
Certificates	
X-ray test on pressure bearing weldings	M56
Dye penetration test on pressure bearing weldings	M58
Tag name plate	
Stainless steel tag with 3 mm characters, max. $2 \times 8$ characters (40 $\times$ 20 mm, add plain text)	Y17
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	Y18

Required information from customer.
 Required information from compressor manufacturer (data sheet).

# Flow Measurement SITRANS F X

# SITRANS FX300

Selection and Ord	ering data	Artic	le	No	).	Ord	CO	de
SITRANS FX300 S		7 M E	2	7 0	0	•		
	Single transmitter and T <sub>max</sub> = 240 °C (464 °F)			-				
✓ Click on the Arti	cle No. for the online con- PIA Life Cycle Portal.	Ш						
Sensor size	Connection size		Т					
DN 15 (1/2")	DN 15 (½")	1 A						
DN 25 (1")	DN 25 (1")	2 B						
DN 40 (1½")	DN 40 (1½")	2 K						
DN 50 (2")	DN 50 (2")	2 R						
DN 80 (3")	DN 80 (3")	3 L						
DN 100 (4")	DN 100 (4")	3 S						
Nominal pressure								
EN								
PN 16	DN 50 100	E	3					
PN 40	DN 15 100	[	)					
PN 63	DN 50 100	E						
PN 100	DN 15 100	ı	=					
ANSI								
150 lb	1/2 4"		J					
300 lb	1/2 4"	H	(					
600 lb	1/2 4"	ı						
Sensor material/G	asket							
St. steel AISI 316L ( (1.4435)/FPM	1.4404)/AISI 316L		1					
St. steel AISI 316L ( (1.4435)/FFKM	1.4404)/AISI 316L		5					
Transmitter design	n	_						
Compact version -	no cable			1				
Remote version:								
5 m (16.4 ft)				2				
10 m (32.8 ft)				3				
15 m (49.2 ft)				4				
Approval and cab	le gland							
Non-Ex, M20 x 1.5					1			
Non-Ex, ½" NPT					2			
FM approval Class	1 Div. 2, M20 x 1.5				3			
ATEX, M20 x 1.5					4			
ATEX, 1/2" NPT					5			
FM approval Class	1 Div. 1, M20 x 1.5				6			
FM approval Class	1 Div. 1, 1/2" NPT				7			
FM approval Class	1 Div. 2, 1/2" NPT				8			
Further approvals a	and cable glands							
IEC Ex with M20 x	1.5				9		N O	A
IEC Ex with 1/2" NPT					9		N O	B
Transmitter, displa	ay and communication							

Selection and Ordering data	Article No.	Ord	. code
SITRANS FX300 Sandwich	7ME2700	•	
Single transmitter and T <sub>max</sub> = 240 °C (464 °F)		Ŧ	-
Pressure sensor and isolation valve			
Without pressure sensor		Α	
With pressure sensor, range:			
4 bar (58 psi)		В	
6 bar (87 psi)		D	
10 bar (145 psi)		E	
16 bar (232 psi)		G H	
25 bar (363 psi) 40 bar (580 psi)		K	
60 bar (870 psi)		L	
100 bar (1450 psi)		N	
With isolation valve and pressure sensor,			
range:			
4 bar (58 psi)		P	
6 bar (87 psi)		Q	
10 bar (145 psi)		R	
16 bar (232 psi)		S	
25 bar (363 psi)		U	
40 bar (580 psi)		V	
60 bar (870 psi)		W	
100 bar (1450 psi)		Y	
Software			
Uncompensated for liquids and gases, den-		1	
sity compensated by temperature for satu- rated steam			
Density compensation for superheated steam		4	
Density compensated by temperature and		5	
pressure for superheated steam, gross heat			
meter - setting of energy metering at option Y51 Y56			
Density compensation for gases, wet gases and mixed gases - setting of relative humid-		7	
ity at option Y49			
Density compensation for gases, wet gases		8	
and mixed gases, Free air delivery (FAD) -			
setting of FAD at option Y81 Y87 and rela-			
tive humidity at option Y49			

# SITRANS F X

#### **SITRANS FX300**

Selection and Ordering data	Order code
<b>Additional information</b> Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	Y47
Relative humidity of process medium in %	Y49
Settings of gross heat	
Variable current output: Flow rate, power	Y51
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	Y52
Fullscale value power	Y53
Variable pulse output: Totalized flow, energy	Y54
Totalizer on/off	Y55
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	Y56
Settings of FAD	
Inlet suction temperature <sup>1)</sup>	Y81
Atmospheric pressure <sup>1)</sup>	Y82
Pressure drop at inlet suction filter <sup>2)</sup>	Y83
Inlet relative humidity <sup>1)</sup>	Y84
Actual compressor rotation (rpm) <sup>2)</sup>	Y85
Rated compressor rotation (rpm) <sup>2)</sup>	Y86
Relative humidity at compressor outlet <sup>2)</sup>	Y87

#### Operating instructions

Description	Article No.			
English	A5E2100423			

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	A10
Material certificate	
Certificate of compliance EN 10204-2.1	C10
Pressure test + 3.1 accordance EN 10204	C11
Material certificate of pressure bearing parts + certificate 3.1	C12
Material in accordance with NACE MR 0175-01	C13
PMI of pressure bearing metal parts + certificate 3.1	C14
Material certificate of pressure bearing parts + PMI + certificate 3.1	C15
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	D11
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	H30
Cleaning	
Cleaning class 1	K46
Cleaning class 1 + certificate 3.1 acc. EN 10204	K48
Certificates	
X-ray test on pressure bearing weldings	M56
Dye penetration test on pressure bearing weldings	M58
Tag name plate	
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	Y17
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	Y18

Required information from customer.
 Required information from compressor manufacturer (data sheet).

# Flow Measurement SITRANS F X

#### **SITRANS FX300**

Selection and Orde	ering data	Artic	le	Nc	).	0	rd	. С	00	de	
SITRANS FX300 FI		7 M E	2	8 (	0 (	-					ľ
Dual transmitter at T <sub>max</sub> = 240 °C (464				Į.				Ē			
✓ Click on the Artic	cle No. for the online con- PIA Life Cycle Portal.										
DN 40 (1½") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6") DN 200 (8") DN 250 (10") DN 300 (12")	Connection size  DN 40 (1½")  DN 50 (2")  DN 80 (3")  DN 100 (4")  DN 150 (6")  DN 200 (8")  DN 250 (10")  DN 300 (12")	2 K 2 R 3 L 3 S 4 M 4 T 4 W 5 E									
Flange norm and r	nominal pressure										
Form B1/B2 PN 10 PN 16 PN 25 PN 40 PN 63 PN 100	EN 1092-1 DN 200 300 DN 50 300 DN 200 300 DN 40 300 DN 50 150 DN 40 150	A E C E	3 ; )								
RF 150 lb 300 lb 600 lb	ANSI B16.5 1½ 12" 1½ 12" 1½ 6"	J K L	1								
Sensor material/Ga Stainless steel AISI AISI 316L (1.4435)// Stainless steel AISI AISI 316L (1.4435)//	316L (1.4404)/ FPM 316L (1.4404)/		1 5								
Transmitter design	1										
Compact version - r Remote version: 5 m (16.4 ft) 10 m (32.8 ft) 15 m (49.2 ft)	no cable			1 2 3 4							
Approval and cable	e gland	-									
Non-Ex, M20 x 1.5 Non-Ex, ½" NPT FM approval Class ATEX, M20 x 1.5 ATEX, ½" NPT FM approval Class FM approval Class FM approval Class Further approvals a	1 Div. 1, M20 x 1.5 1 Div. 1, 1/2" NPT 1 Div. 2, 1/2" NPT				1 2 3 4 5 6 7 8						
IEC Ex with M20 x 1					9					A B	
-	y and communication				,			ľ	J	٠	
With display, HART	,					A					
Pressure sensor a Without pressure se						A					
Software Uncompensated for density-compensate saturated steam	liquids and gases, d by temperature for						1				

Selection and Ordering data	Order code
Additional information Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow (1 pulse/unit)	Y47
Relative humidity of process medium in %	Y49

# Operating instructions for SITRANS FX300

Description	Article No.	
English	A5E2100423	

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at: http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	A10
Material certificate	
Certificate of compliance EN 10204-2.1	C10
Pressure test + 3.1 accordance EN 10204	C11
Material certificate of pressure bearing parts + certificate 3.1	C12
Material in accordance with NACE MR 0175-01	C13
PMI of pressure bearing metal parts + certificate 3.1	C14
Material certificate of pressure bearing parts + PMI + certificate 3.1	C15
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	D11
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	H30
Cleaning	
Cleaning class 1	K46
Cleaning class 1 + certificate 3.1 acc. EN 10204	K48
Certificates	
X-ray test on pressure bearing weldings	M56
Dye penetration test on pressure bearing weldings	M58
Tag name plate	
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	Y17
Stainless steel tag with 2.5 mm characters, max. $8 \times 40$ characters (120 x 46 mm, add plain text)	Y18

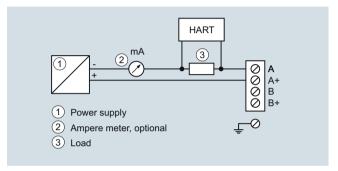
# SITRANS F X

# SITRANS FX300

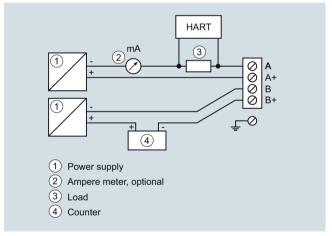
SITRANS FX300 spare par	ts	
Description	Article No.	
Seal disc 21.8-12-0.1	A5E02181439	
O-ring pickup	A5E02181464	
O-ring for pressure screw 17.13 x 2.62-FPM-70	A5E02181488	
Cover gasket O-Ring 91.67 x 3.5	A5E02181492	
Converter housing gasket 59.35.5-2-N	A5E02181495	
O-ring DIN3771-20 x 1-FPM for sensor	A5E02181515	
O-ring 10 x 2-NBR for lead-through	A5E02181525	
DUBOX plug, 5-pole-RM2	A5E02181527	
Electronic		
Basic D-HART	A5E02181531	1
• Steam D-HART	A5E02181541	
• Gas D-HART	A5E02181544	
	A5E02181558	
Display		G MINNET (I)
Cable feedthrough 10-pole (non-Ex). O-ring for cable feedthrough 21.89 x 2.62 10-pole plug	A5E02181562	
Sensor replacement (incl. Seal disc, pickup, O-rings for pickup, and pressure screw  • DN 15 (incl. ½" socket)  • DN 25 (incl. 1" socket)  • DN 40 100  • DN 150 300	A5E02181087 A5E02181116 A5E02181152 A5E02275105	
Pressure sensor replacement (Incl. pressure sensor, DUBOX plug, 2 O-rings and calibration certificate)  • 4 bar (58 psi)  • 6 bar (87 psi)  • 10 bar (145 psi)  • 16 bar (232 psi)  • 25 bar (363 psi)  • 40 bar (580 psi)  • 60 bar (870 psi)	A5E02181157 A5E02181175 A5E02181180 A5E02181221 A5E02181307 A5E02181316 A5E02181322	
• 100 bar (1450 psi)	A5E02181437	

Description	Article No.	
Service Toolbox for programming software (basic, steam and gas); for changing settings and diagnostics	A5E02375819	
Note: Dedicated service training is required. Please contact Customer Support.		

# Schematics



Connection power supply and HART communication



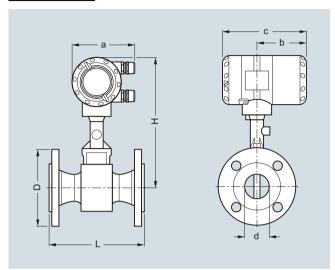
Connection pulse output

# Flow Measurement SITRANS F X

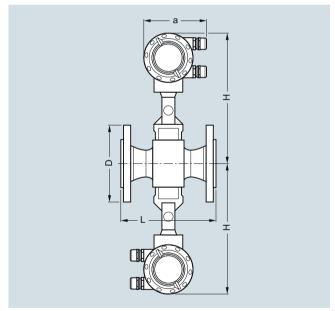
SITRANS FX300

# Dimensional drawings

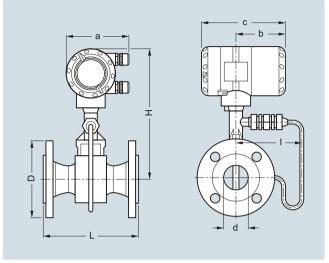
# Compact version



Flange version



Flange version, dual converter



Flange version with pressure sensor

SITRANS F X

# SITRANS FX300

#### Flange version EN1092-1

Size	Pres- sure rating	Dimensions [ a = 135 (5.32)	mm (inch)] , b = 108 (4.26),	, c = 184 (7.25)					Weight [kg (lb)]	1)
DN	PN	d	d FR <sup>2)</sup>	d F2R <sup>3)</sup>	D	L	н	I	Flowmeter (without pres- sure sensor)	Flowmeter (with pressure sensor)
15	40	17.3 (0.68)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.5 (12.13)	6.1 (13.45)
15	100	17.3 (0.68)	-	-	105 (4.13)	200 (7.87)	315 (12.40)	144 (5.67)	6.5 (14.33)	7.1 (15.65)
25	40	28.5 (1.12)	17.3 (0.68)	-	115 (4.53)	200 (7.87)	315 (12.40)	144 (5.67)	7.3 (16.09)	7.9 (17.42)
25	100	28.5 (1.12)	17.3 (0.68)	-	140 (5.51)	200 (7.87)	315 (12.40)	144 (5.67)	9.3 (20.50)	9.9 (21.83)
40	40	43.1 (1.70)	28.5 (1.12)	17.3 (0.68)	150 (5.91)	200 (7.87)	320 (12.60)	144 (5.67)	10.2 (22.49)	10.8 (23.81)
40	100	42.5 (1.67)	28.5 (1.12)	17.3 (0.68)	170 (6.69)	200 (7.87)	320 (12.60)	144 (5.67)	14.2 (31.31)	14.8 (32.63)
50	16	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.1 (26.68)	12.7 (28.00)
50	40	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.3 (27.12)	12.9 (28.44)
50	63	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	180 (7.09)	200 (7.87)	325 (12.80)	144 (5.67)	16.3 (35.94)	16.9 (37.26)
50	100	53.9 (2.12)	42.5 (1.67)	28.5 (1.12)	195 (7.68)	200 (7.87)	325 (12.80)	144 (5.67)	17.8 (39.24)	18.4 (40.57)
80	16	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	16.8 (37.04)	17.4 (38.36)
80	40	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	18.8 (41.45)	19.4 (42.77)
80	63	81.7 (3.22)	54.5 (2.15)	42.5 (1.67)	215 (8.46)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
80	100	80.9 (3.19)	54.5 (2.15)	42.5 (1.67)	230 (9.06)	200 (7.87)	340 (13.39)	154 (6.06)	26.8 (59.08)	27.4 (60.41)
100	16	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	220 (8.66)	250 (9.84)	360 (14.17)	164 (6.46)	21.4 (47.18)	22 (48.50)
100	40	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	235 (9.25)	250 (9.84)	360 (14.17)	164 (6.46)	24.4 (53.79)	25 (55.12)
100	63	106.3 (4.19)	80.9 (3.19)	54.5 (2.15)	250 (9.84)	250 (9.84)	360 (14.17)	164 (6.46)	29.4 (64.82)	30 (66.14)
100	100	104.3 (4.11)	80.9 (3.19)	54.5 (2.15)	265 (10.43)	250 (9.84)	360 (14.17)	164 (6.46)	35.4 (78.04)	36 (79.37)
150	16	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	285 (11.22)	300 (11.81)	375 (14.76)	174 (6.85)	35.2 (77.60)	35.8 (78.93)
150	40	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	300 (11.81)	300 (11.81)	375 (14.76)	174 (6.85)	41.2 (90.83)	41.8 (92.15)
150	63	157.1 (6.19)	107.1 (4.22)	80.9 (3.19)	345 (13.58)	300 (11.81)	375 (14.76)	174 (6.85)	59.2 (130.51)	59.8 (131.84)
150	100	154.1 (6.07)	107.1 (4.22)	80.9 (3.19)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	67.2 (148.15)	67.8 (149.47)
200	10	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	16	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	25	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	360 (14.17)	300 (11.81)	400 (15.75)	194 (7.64)	46.8 (103.18)	47.4 (104.50)
200	40	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	375 (14.76)	300 (11.81)	400 (15.75)	194 (7.64)	54.8 (120.81)	55.4 (122.14)
250	10	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	395 (15.55)	380 (14.96)	420 (16.54)	224 (8.82)	57.4 (126.55)	58.0 (127.87)
250	16	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	58.4 (128.75)	59.0 (130.07)
250	25	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	425 (16.73)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
250	40	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	450 (17.72)	380 (14.96)	420 (16.54)	224 (8.82)	92.4 (203.71)	93.0 (205.03)
300	10	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	445 (17.52)	450 (17.72)	445 (17.52)	244 (9.61)	75.7 (166.89)	76.3 (168.21)
300	16	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	460 (18.11)	450 (17.72)	445 (17.52)	244 (9.61)	82.2 (181.22)	82.8 (182.54)
300	25	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	98.7 (217.60)	99.3 (218.92)
300	40	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	515 (20.28)	450 (17.72)	445 (17.52)	244 (9.61)	127.5 (281.09)	128.1 (282.41)

<sup>1)</sup> For dual converter: specified weight + 2.80 kg (6.17 lb).
2) FR - single reduction
3) F2R - double reduction

# **Flow Measurement** SITRANS F X

SITRANS FX300

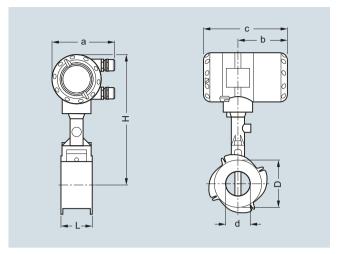
Flange version ANSI B16.5

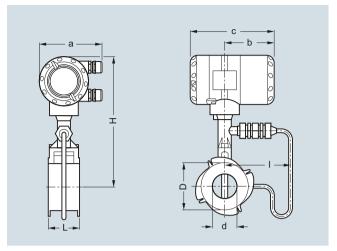
Size	Pres-	Dimensions [	Weight [kg (lb)] <sup>1)</sup>							
	sure rating	a = 135 (5.32),	b = 108 (4.26)	, c = 184 (7.25)						
DN	Class	d	d FR <sup>2)</sup>	d F2R <sup>3)</sup>	D	L	Н	I	Flowmeter (without pres- sure sensor)	Flowmeter (with pres- sure sensor)
1/2	150	15.8 (0.62)	-	-	90 (3.54)	200 (7.87)	315 (12.40)	144 (5.67)	4.5 (9.92)	5.1 (11.24)
1/2	300	15.8 (0.62)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	4.9 (10.80)	5.5 (12.13)
1/2	600	13.9 (0.55)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.1 (11.24)	5.7 (12.57)
1	150	26.6 (1.05)	15.8 (0.62)	-	110 (4.33)	200 (7.87)	315 (12.40)	144 (5.67)	6.2 (13.67)	6.8 (14.99)
1	300	26.6 (1.05)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.2 (15.87)	7.8 (17.20)
1	600	24.3 (0.96)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.5 (16.53)	8.1 (17.86)
1½	150	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	125 (4.92)	200 (7.87)	320 (12.60)	144 (5.67)	8.3 (18.30)	8.9 (19.62)
1½	300	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	10.4 (22.93)	11 (24.25)
1½	600	38.1 (1.50)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	11.4 (25.13)	12 (26.46)
2	150	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	150 (5.91)	200 (7.87)	325 (12.80)	144 (5.67)	11 (24.25)	11.6 (25.57)
2	300	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.4 (27.34)	13 (28.66)
2	600	49.3 (1.94)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	13.9 (30.64)	14.5 (31.97)
3	150	78 (3.07)	52.6 (2.07)	40.9 (1.61)	190 (7.48)	200 (7.87)	340 (13.39)	154 (6.06)	19.8 (43.65)	20.4 (44.97)
3	300	78 (3.07)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
3	600	73.7 (2.90)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	23.8 (52.47)	24.4 (53.79)
4	150	102.4 (4.03)	78 (3.07)	52.6 (2.07)	230 (9.06)	250 (9.84)	360 (14.17)	164 (6.46)	23.4 (51.59)	24 (52.91)
4	300	102.4 (4.03)	78 (3.07)	52.6 (2.07)	255 (10.04)	250 (9.84)	360 (14.17)	164 (6.46)	31.4 (69.23)	32 (70.55)
4	600	97.2 (3.83)	78 (3.07)	52.6 (2.07)	275 (10.83)	250 (9.84)	360 (14.17)	164 (6.46)	40.4 (89.07)	41 (90.39)
6	150	154.2 (6.07)	102.4 (4.03)	78 (3.07)	280 (11.02)	300 (11.81)	375 (14.76)	174 (6.85)	36.2 (79.81)	36.8 (81.13)
6	300	154.2 (6.07)	102.4 (4.03)	78 (3.07)	320 (12.60)	300 (11.81)	375 (14.76)	174 (6.85)	51.2 (112.88)	51.8 (114.20)
6	600	146.3 (5.76)	102.4 (4.03)	78 (3.07)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	46.2 (101.85)	76.8 (169.31)
8	150	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	345 (13.58)	300 (11.81)	400 (15.75)	194 (7.64)	50.0 (110.23)	50.6 (111.55)
8	300	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	380 (14.96)	300 (11.81)	400 (15.75)	194 (7.64)	74.8 (164.91)	75.4 (166.23)
10	150	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
10	300	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	455 (17.91)	380 (14.96)	420 (16.54)	224 (8.82)	106.4 (234.57)	107.0 (235.89)
12	150	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	106.3 (234.35)	106.9 (235.67)
12	300	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	520 (20.47)	450 (17.72)	445 (17.52)	244 (9.61)	151.3 (333.56)	151.9 (334.88)

 <sup>1)</sup> For dual converter: specified weight + 2.80 kg (6.17 lb).
 2) FR - single reduction
 3) F2R - double reduction

# SITRANS F X

# SITRANS FX300





Sandwich version

Sandwich version with pressure sensor

#### Sandwich version EN

Size	Pressure rating	Dimension	ns [mm (inc	h)]						Weight [kg (lb)]				
DN	PN	а	b	С	d	D	L	Н		Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sensor)			
15	16 100	133 (5.24)	105 (4.13)	179 (7.05)	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	3.5 (7.72)	4.1 (9.04)			
25	16 100	133 (5.24)	105 (4.13)	179 (7.05)	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	144 (5.67)	4.3 (9.48)	4.9 (10.80)			
40	16 100	133 (5.24)	105 (4.13)	179 (7.05)	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	144 (5.67)	4.9 (10.80)	5.5 (12.13)			
50	16 100	133 (5.24)	105 (4.13)	179 (7.05)	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	144 (5.67)	6 (13.23)	6.6 (14.55)			
80	16 100	133 (5.24)	105 (4.13)	179 (7.05)	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	155 (6.10)	8.2 (18.08)	8.8 (19.40)			
100	16 100	133 (5.24)	105 (4.13)	179 (7.05)	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	164 (6.46)	9.5 (20.94)	10.1 (22.27)			

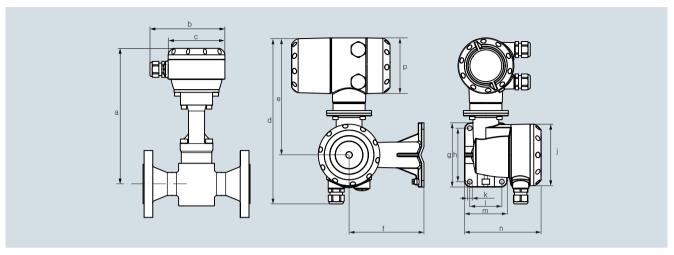
#### Sandwich version ANSI

Size	Pressure rating	Dimens	ions [inch	]							
DN	Class	а	b	С	d	D	L	Н	I	Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sensor)
1/2"	150, 300, 600	5.24	4.13	7.05	0.63	1.77	2.56	10.43	5.67	7.72	9.04
1"	150, 300, 600	5.24	4.13	7.05	0.94	2.56	2.56	10.43	5.67	9.48	10.80
11/2"	150, 300, 600	5.24	4.13	7.05	1.50	3.23	2.56	10.63	5.67	10.80	12.13
2"	150, 300, 600	5.24	4.13	7.05	1.97	4.02	2.56	10.83	5.67	13.23	14.55
3"	150, 300, 600	5.24	4.13	7.05	2.91	5.31	2.56	11.42	6.10	18.08	19.40
4"	150, 300, 600	5.24	4.13	7.05	3.82	6.22	2.56	12.20	6.46	20.94	22.27

# Flow Measurement SITRANS F X

SITRANS FX300

#### Remote version



#### Flanged version

riangea	VC101011																	
DN	15	25		40		50	80		100		150	200	2	250		300		
	1/2"	1"		11/2'	"	2"	3 "		4 "		6"	8"	1	10"		12"		
	а	·		<u> </u>				·		·			<u>'</u>		·			
[mm]	248	248	3	253	3	258	273		293		308	333		333		353		378
[inch]	9.77	9.7	7	9.97	7	10.2	10.8		11.5	Ò	12.1	13.1	-	13.9		14.9		
	b	С	d		е	f	g	h		j	k	I	m		n	р		
[mm]	140	Ø106	310		219	140	120	100		Ø115	Ø9 (4x)	60	80		144	104		
[inch]	5.52	Ø4.18	12.2		8.63	5.52	4.73	3.94		Ø4.53	Ø0.36 (4x)	2.36	3.15		5.67	4.09		

# Sandwich version

DN	15	25	40	50	80	100
	1/2"	1"	1½"	2"	3 "	4 "
	a					
[mm]	248	248	253	258	273	293
[inch]	9.77	9.77	9.97	10.2	10.8	11.5

	b	С	d	е	f	g	h	j	k	I	m	n	p
[mm]	140	Ø106	310	219	140	120	100	Ø115	Ø9 (4x)	60	80	144	104
[inch]	5.52	Ø4.18	12.2	8.63	5.52	4.73	3.94	Ø4.53	Ø0.36 (4x)	2.36	3.15	5.67	4.09

SITRANS F X

#### **SITRANS FX300**

#### Flow tables

Measuring Range Limits

#### Water

Size		Q <sub>min</sub>	Q <sub>max</sub>	Q <sub>min</sub>	Q <sub>max</sub>
DN to EN 1092-1	DN to ANSI B16.5	EN 1092-1 [m <sup>3</sup> /h]	EN 1092-1 [m <sup>3</sup> /h]	ANSI B16.5 [m <sup>3</sup> /h]	ANSI B16.5 [m <sup>3</sup> /h]
15	1/2"	0.45	5.07	0.44	4.94
25	1"	0.81	11.40	0.81	11.40
40	1½"	2.04	28.58	2.04	28.58
50	2"	3.53	49.48	3.53	49.48
80	3"	7.74	108.37	7.74	108.37
100	4"	13.30	186.22	13.30	186.21
150	6"	30.13	421.86	30.13	421.86
200	8"	56.60	792.42	56.60	792.42
250	10"	90.48	1 266.8	90.48	1 266.8
300	12"	131.41	1 839.8	131.41	1 839.8

Values based on water at 20 °C (68 °F)

#### Air

Size		Q <sub>min</sub>	Q <sub>max</sub>	Q <sub>min</sub>	Q <sub>max</sub>
DN to EN 1092-1	DN to ANSI B16.5	EN 1092-1 [m <sup>3</sup> /h]	EN 1092-1 [m <sup>3</sup> /h]	ANSI B16.5 [m <sup>3</sup> /h]	ANSI B16.5 [m <sup>3</sup> /h]
15	1/2"	6.80	25.33	6.72	24.70
25	1"	10.20	81.43	10.20	81.43
40	1½"	25.35	326.63	25.35	326.63
50	2"	43.89	565.49	43.89	565.49
80	3"	96.14	1 238.64	96.14	1 238.60
100	4"	165.19	2 128.27	165.19	2 128.27
150	6 <sup>"</sup>	374.23	4 821.60	374.23	4 821.60
200	8"	702.95	9 056.8	702.95	9 056.8
250	10"	1 123.7	14 478.0	1 123.7	14 478.0
300	12"	1 632.1	21 028.0	1 632.1	21 028.0

Values based on air at 20 °C (68 °F) and 1.013  $\rm bar_{abs}$  (14.7  $\rm psi_{abs})$ 

#### Flow rate limits

Product	Nominal diameters		Minimum flow rates	Maximum flow rates
	to EN	to ANSI	[m/s]	[m/s]
Liquids	DN 15 DN 300	DN ½"DN 12"	0.5 x (998/ρ) <sup>0.5 1)</sup>	$7 \times (998/\rho)^{0.47}$
Gas, steam/vapor	DN 15 DN 300	DN 1/2"DN 12"	6 x (1.29/ρ) <sup>0.5 2)</sup>	$7 \times (998/\rho)^{0.47 \ 3)}$

 $\rho$  = operating density [kg/m<sup>3</sup>]

Minimum flow rate 0.3 m/s (0.984 ft/s), maximum flow rate 7 m/s (23 ft/s)
 Minimum flow rate 2 m/s (6.6 ft/s)
 Maximum flow rate 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

# Flow Measurement SITRANS F X

SITRANS FX300

Measuring range saturated steam: 1 to 7 bar

Overpressure	e [bar]	1		3.5		5.2		7	
Density [kg/m³] 1.13498			2.4258		3.27653		4.16732		
Temperature	[°C]	120.6		148.2		160.4		170.6	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	1/2"	5.87	28.75	7.68	61.46	8.93	83.01	10.06	105.57
25	1"	11.82	92.42	17.28	197.53	20.09	266.81	22.66	339.35
40	11/2"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.8	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696	743.45	15 798	838.44	20 093
200	8"	821.9	10 279.0	1 201.6	21 970.0	1 396.5	29 675.0	1 574.9	37 743
250	10"	1 313.9	16 433.0	1 920.9	35 122.0	2 232.5	47 439.0	2 517.7	60 337
300	12"	1 908.3	23 866.0	2 789.8	51 010.0	3 242.4	68 899.0	3 656.6	87 630

Measuring range saturated steam: 10.5 to 20 bar

Overpressure [bar] Density [kg/m³]				14		17.5		20	
				7.60297	7.60297		9.31702		
Temperatur	e [°C]	186.2		198.5	198.5		208.7		
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	1/2"	12.78	149.17	16.51	192.61	20.23	236.04	22.89	267.12
25	1"	26.93	479.46	30.6	619.11	33.87	758.69	36.04	858.62
40	11/2"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.9	14 013	553.38	15 608	588.69	16 666
150	6"	996.62	27 725	1 132.5	31 747	1 253.7	35 359	1 333.7	37 756
200	8"	1 872.1	52 079	2 127.3	59 634	2 354.9	66 419	2 505.2	70 921
250	10"	2 992.7	83 254	3 400.7	95 333	3 764.6	106 180	4 004.9	113 380
300	12"	4 346.5	120 920	4 939.1	138 460	5 467.5	154 210	5 816.5	164 660

SITRANS F X

# SITRANS FX300

Measuring range saturated steam: 15 to 100 psig

Overpressur	e [psig]	15		50		75		100		
Density [lb/ft³]		0.0719		0.1497	0.1497		0.2036		0.2569	
Temperature	[°F]	249.98		297.86		320.36		338.184		
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.	
DN to EN 1092-1	DN to ANSI B16.5									
15	1/2"	12.95	64.35	16.83	133.87	19.62	182.02	22.04	229.63	
25	1"	26.25	206.83	37.86	430.3	44.15	585.06	49.59	738.09	
40	11/2"	65.81	829.61	94.92	1 726	110.68	2 346.7	124.32	2 960.5	
50	2"	113.94	1 436.3	164.34	2 988	191.63	4 062.9	215.23	5 125.6	
80	3"	249.57	3 146.1	360	6 545.3	419.74	8 899.4	471.45	11 227	
100	4"	428.81	5 405.7	618.51	11 246	721.21	15 291	810.06	19 291	
150	6"	971.47	12 246	1 401.2	25 478	1 633.9	34 642	1 835.2	43 703	
200	8"	1 824.8	23 004	2 632.1	47 859	3 069.1	65 072	3 447.2	82 092	
250	10"	2 917.2	36 774	4 207.7	76 508	4 906.4	104 030	5 510.8	131 230	
300	12"	4 236.8	53 410	6 111.1	111 120	7 125.8	151 080	8 003.6	190 600	

Measuring range saturated steam: 150 to 300 psig

Overpressur	Overpressure [psig] 150		200		250		300		
Density [lb/ft³] 0.3627		0.4681		0.5735		0.6792			
Temperature	[°F]	366.08		388.04		406.22		422.06	
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	1/2"	27.79	324.21	35.86	418.47	43.94	512.66	52.04	607.12
25	1"	58.93	1 042.1	66.94	1 345.1	74.1	1 647.8	80.63	1 951.5
40	11/2"	147.72	4 107.2	167.83	4 702.8	185.76	5 237	202.15	5 728
50	2"	255.75	7 111.9	290.56	8 141.9	321.6	9 066.8	350	9 917
80	3"	560.19	15 578	636.44	17 834	704.43	19 860	766.6	21 722
100	4"	962.54	26 766	1 093.5	30 643	1 210.4	34 124	1 317.2	37 324
150	6"	2 180.6	60 639	2 477.4	69 421	2 742.1	77 307	2 984	84 556
200	8"	4 096.1	113 900	4 653.6	130 400	5 150.7	145 210	5 605.2	158 830
250	10"	6 548.1	182 090	7 439.3	208 460	8 234.1	232 140	8 960.6	253 910
300	12"	9 510.2	264 460	10 805	302 760	11 959	337 150	13 014	368 770

#### Flow Measurement SITRANS F VA

#### SITRANS FVA250 variable area meter

#### Overview



SITRANS FVA250 variable area meter

#### Benefits

- Standard design available at short notice
- Robust all-metal fitting with impact-resistant housing cover
- Can also be used for corrosive and flammable media
- Use possible at high pressures and temperatures
- Product and percentage scales
- · Can be optionally fitted with heating and cooling sheaths
- · Contamination-insensitive guiding of float

#### Application

The devices are particularly suitable for measuring:

- Water
- Liquids
- Anti-corrosives and lubricants
- Solvents
- Saturated and superheated steam
- · Food and beverages
- Industrial gases

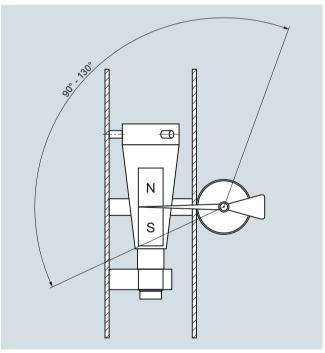
#### Design

Due to its full metal design, the SITRANS FVA250 variable area meter with a standard length of 250 mm (9.84 inch) can be used to measure many different types of liquids and gases passing through closed piping. The robust design means that it can also be used in harsh conditions. The various types of flange connections, linings and float materials satisfy the requirements of the pharmaceutical and chemical industries.

The measured value is displayed directly on the scale with the standard version. For process monitoring and control, the device can be equipped with a transmitter (MEM) as well as limit switches.

#### Function

Flow measurement with the SITRANS FVA250 is performed according to the float principle. The flowing medium lifts the conical float in the measuring ring. This increases the ring gap until an equilibrium is established between the buoyant force of the medium and the weight of the float. The height of the float is directly proportional to the flow rate. The movement of the float is transmitted from one magnet to another magnet in the display unit outside of the measuring tube.



Measuring cone/scale angle

Limit switch

#### **Flow Measurement**

#### SITRANS F VA

#### SITRANS FVA250 variable area meter

Technical specifications	
Application	See page 3/411
Design and function	See page 3/411
Measuring principle	Variable area flowmeter
Input	
Measuring range	See table on page 3/413
Pressure rating	PN 16 PN 100 (232 1450 psi) depending on version (see table on page 3/413)
Installation/flow direction	Vertical/from bottom to top
Rated operating conditions	
Ambient temperature	
<ul> <li>With local display</li> </ul>	-40 +80 °C (-40 +176 °F)
With limit switches	-40 +65 °C (-40 +149 °F)
<ul> <li>With electric remote encoder (MEM)</li> </ul>	-40 +70 °C (-40 +156 °F)
Measuring accuracy	
• For liquids	± 1.6%
• For gases	± 2.0%
Reproducibility	0.5 % of the measuring range limit (URV)
Operating temperature	see page 3/413
Operating pressure	Min. operating pressure > 2x pressure drop (see table on page 3/413)
Design	
Flanges	EN 1092-1, ANSI B16.5
Material	
• Fitting	Stainless steel 1.4404/316L
• Float	Stainless steel 1.4404/316L, Hastelloy, PTFE
Wetted parts materials	Stainless steel 1.4404/316L, PTFE, Hastelloy, depending on version
Degree of protection (display unit)	
Display unit made of aluminum	IP65
<ul> <li>Display unit made of stainless steel</li> </ul>	IP66
Electromagnetic immunity	
• EN 61000-6-2: 1999	Interference immunity industrial sector
• EN 50081-1	Emitted interference residential sector
• EN 55011: 1998 + A1: 1999	Group 1, Class B
<ul> <li>NAMUR recommendation</li> </ul>	NE 21

# Classification according to pressure equipment directive (DGRL 97/23/EG)

	Article No. 7ME5822- 7ME5823-	Permissible media	Category
DN 15	xAxxx-xxxx	Gases of fluid group 1 and	Article 3.3
DN 20	xFxxx-xxxx	liquids of fluid group 1	Article 3.3
DN 25	xBxxx-xxxx	_	Article 3.3
DN 32	xGxxx-xxxx	_	Ш
DN 40	xHxxx-xxxx		Ш
DN 50	xCxxx-xxxx		III
DN 65	xJxxx-xxxx	_	Ш
DN 80	xDxxx-xxxx		Ш
DN 100	xExxx-xxxx		III

# Technical specifications of contacts

Cable gland	M20x1.5
Auxiliary power supply	5 25 V DC
Isolation (2 contacts)	Electrically isolated
Limit switch	SJ3.5-N-BU
Switching function	NAMUR NC
Nominal voltage U <sub>0</sub>	8.2 V DC ( $R_i$ approx. 1 $k\Omega$ )
Explosion protection	II 2G EEx ia IIC T6 - T4
EC-Type Examination Certificate for Directive 94/9/EG	PTB 99 ATEX 2219 X
Transmitter (MEM) with 4 20 mA, pulse output and limit switch	
Cable gland	M20x1.5
Auxiliary power supply	14 30 V DC
Analog output	4 20 mA (2-wire technology)
Binary output	Pulses, limit switch
• Pulses	Max. pulse rate 10 Hz
Limit switch	SJ3.5-N-BU (NAMUR, NC)
Temperature influence	$\leq \pm0.5$ % of the measuring range limit (URV)/10 K
Explosion protection	ATEX II 2G EEx ia IIC T6
EC-Type Examination Certificate for Directive 94/9/EG	BVS 07 ATEX E 033
Transmitter (MEM) PROFIBUS PA	
Cable gland	M20x1.5
Auxiliary power supply	10 25 V DC
Basic current	< 16.5 mA
Fault current	< 18 mA
Transfer rate	31.25 kBaud
Temperature influence	≤ ± 0.5 % of the measuring range

# Float damping

Explosion protection

for Directive 94/9/EG

Float damping is recommended

EC-Type Examination Certificate

- Generally for gas measurement
- When air bubbles in the medium cannot be avoided.
- When there are pressure surges in the lines caused by a delay in the flow, for example, due to rapid throttling or blocking

limit (URV)/10 K ATEX II 2G EEx ia IIC T6

BVS 07 ATEX E 033

- When turbulence, pulsations or other instabilities cause the float to vibrate.
- When the flow pressure cannot be built up slowly
- When vibrations in the line cannot be avoided

# Flow Measurement SITRANS F VA

# SITRANS FVA250 variable area meter

# Technical specifications (continued)

#### Permitted measuring ranges

V	05.0	FFII	EE D			
Version	CF-S	EF-H	FF-P			
Wetted parts materials	Mat. no. 1.4404/316L	Hastelloy C	PTFE			
Fitting	Mat. no. 1.4404/316L	≤ DN 25 (1"): Hastelloy > DN 25 (1"): Hastelloy/stainless steel 1.4404/316L	Mat. no. 1.4404/316L with PTFE lining			
Flange	Mat. no. 1.4404/316L	≤ DN 25 (1"): Hastelloy > DN 25 (1"): Hastelloy/Edelstahl 1.4404/316L	Mat. no. 1.4404/316L			
Float/flow tube	Mat. no. 1.4404/316L	Hastelloy	PTFE			
Max. media temperature	-20 +200 °C (-4 +392 °F) (optional -80 +350 °C (-112	+662 °F))	-20 +125 °C (-4 +257 °F)			
Nominal pressure	DN15 80 (½ 3"): PN 40 (580 psi) DN100 (4"): PN 16 (232 psi) optional up to 400 bar (5800 psi	DN15 80 (½ 3"): PN 40 (580 psi) DN100 (4"): PN 16 (232 psi) ) optional up to 400 bar (5800 psi	PN 16 (232 psi)			
Reference data for measuring range specification	Fluid in I/h with density: 1,0 kg/l, temperature 20 °C (68 °F), viscosity: 1 mPa's					

Fluid in I/h with density: 1,0 kg/l, temperature 20 °C (68 °F), viscosity: 1 mPa: Gas in m³/h with density: 1.293 kg/m³, temperature 0 °C (32 °F), viscosity: 0,0181 mPa:s, p<sub>e</sub> = 0 bar (0 psi)

Order								Measuring ranges (dynamic 1:10)					
code	Flow tube						Liquids		Gases				
	1	2	3	4	5	6	7	[l/h]	[USgpm]	[m³/h]	[scfm]		
10	40 <sup>1)</sup>	40 <sup>2)</sup>	-	-	-	-	-	0.5 5	0.0022 0.022	0.015 0.15	0.0088 0.088		
11	44 <sup>1)</sup>	44 <sup>2)</sup>	-	-	-	-	-	0 10	0.0044 0.044	0.03 0.3	0.0177 0.177		
12	40 <sup>1)</sup>	40 <sup>2)</sup>	-	-	-	-	-	1.6 16	0.007 0.07	0.045 0.48	0.0265 0.283		
13	40 <sup>1)</sup>	40 <sup>2)</sup>	-	-	-	-	-	2.5 25	0.011 0.11	0.075 0.75	0.0441 0.441		
14	40 <sup>1)</sup>	40 <sup>2)</sup>	-	-	-	-	-	4 40	0.018 0.18	0.13 1.3	0.0765 0.765		
15	-	40 <sup>2)</sup>	-	-	-	-	-	5 50	0.022 0.22	0.15 1.5	0.0883 0.883		
16	-	40 <sup>2)</sup>	-	-	-	-	-	7 70	0.031 0.31	0.2 2.1	0.12 1.24		
17	-	60	60 <sup>3)</sup>	-	-	-	-	10 100	0.044 0.44	0.3 3	0.177 1.77		
20	-	60	60 <sup>3)</sup>	-	-	-	-	16 160	0.07 0.7	0.5 4.6	0.29 2.71		
21	-	60	60 <sup>3)</sup>	-	-	-	-	25 250	0.11 1.1	0.7 7	0.412 4.12		
22	-	70	70 <sup>3)</sup>	-	-	-	-	40 400	0.176 1.76	1.0 11	0.589 6.47		
23	-	80	80 <sup>3)</sup>	-	-	-	-	60 600	0.264 2.64	1.7 17	1 10		
24	-	-	60	-	-	-	-	100 1 000	0.44 4.4	2 30	1.77 17.66		
25	-	-	70	-	-	-	-	160 1 600	0.7 7	3 46	2.35 27.07		
26	-	-	100	50 <sup>2)</sup>	-	-	-	250 2 500	1.1 11	6 70	4.12 41.2		
27	-	-	240 <sup>2)</sup>	120 <sup>2)</sup>	80	-	-	400 4 000	1.76 17.6	10 110	6.47 64.74		
30	-	-	-	180 <sup>2)</sup>	90	-	-	600 6 000	2.64 26.4	16 170	10 100		
31	-	-	-	-	110	-	-	1 000 10 000	4.4 44	28 290	17.1 170.7		
32	-	-	-	-	230	70	-	1 600 16 000	7 70	45 460	27.1 270.7		
33	-	-	-	-	230	70 <sup>2)</sup>	-	2 000 20 000	8.8 88	55 550	32.4 323.7		
34	-	-	-	-	500 <sup>2)</sup>	100	-	2 500 25 000	11 110	69 700	41.2 412		
35	-	-	-	-	-	350 <sup>2)</sup>	120	4 000 40 000	17.6 176	109 1 100	64.7 647.4		
36	-	-	-	-	-	350 <sup>2)</sup>	120 <sup>2)</sup>	5 000 50 000	22 220	134 1 350	79.5 794.6		
37	-	-	-	-	-	-	360 <sup>2)</sup>	6 000 60 000	26.4 264	169 1 700	100 1 000		
40	-	-	-	-	-	-	600 <sup>2)</sup>	8 000 80 000	35.2 352	239 2 400	141.3 1 413		
41	-	-	-	-	-	-	600 <sup>2)</sup>	10 000 100 000	44 440	299 3 000	176.6 1 766		

<sup>-</sup> Not available

Note: Female thread connection (DIN ISO 228. NPT ANSI B 1.20.1) not available for FF-P.

<sup>1)</sup> Not available for EF-H and FF-P.

<sup>2)</sup> Not available for FF-P.

<sup>3)</sup> Not available for CF-S and EF-H.

SITRANS F VA

# SITRANS FVA250 variable area meter

#### **Permitted nominal diameters**

Order Code	Flange	Flow tube							
	EN 1092-1	ANSI B16.5	1	2	3	4	5	6	7
Α	DN 15	1/2"	•1)	•	•2)	_	_	_	-
В	DN 20	3/4"	<b>●</b> <sup>1)</sup>	•2)	•2)	_	_	_	_
С	DN 25	1"	• <sup>1)</sup>	•2)	•	•2)	_	_	_
D	DN 32	11/4"	• <sup>1)</sup>	•2)	•2)	•2)	_	_	_
E	DN 40	1½"	<b>●</b> <sup>1)</sup>	• <sup>2)</sup>	• <sup>2)</sup>	• <sup>2)</sup>	_	_	_
F	DN 50	2"	• <sup>1)</sup>	•2)	•2)	•2)	•	-	_
G	DN 65	2½"	_	_	•	•	•2)	_	_
Н	DN 80	3"	_	_	-	•	•2)	•	_
J	DN 100	4"	_	_	_	_	•2)	•2)	•

Order Code	Female thread	Flow tube							
	DIN ISO 228	NPT ANSI B 1.20.1	1	2	3	4	5	6	7
Q	G 1⁄4"	1/4" NPT	•	•	_	-	_	_	_
R	G 3/8"	3/8" NPT	•	•	_	_	_	_	_
S	G ½"	½" NPT	•	•	•	•	_	_	_
Т	G ¾"	3/4" NPT	•	•	•	•	_	_	_
U	G 1"	1" NPT	•	•	•	•	•	-	-
V	G 11⁄4"	11/4" NPT	•	•	_	•	•	_	_
w	G 1½"	1½" NPT	_	_	_	•	•	_	_
X	G 2"	2" NPT	_	_	_	_	•	_	_

<sup>•</sup> Available

Note: Female thread connection (DIN ISO 228, NPT ANSI B 1.20.1) not available for FF-P.

<sup>-</sup> Not available

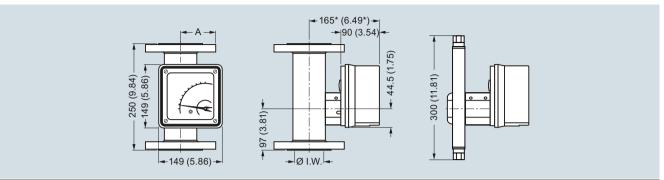
<sup>1)</sup> Not available for EF-H and FF-P.

<sup>&</sup>lt;sup>2)</sup> Not available for FF-P.

### Flow Measurement SITRANS F VA

### SITRANS FVA250 variable area meter

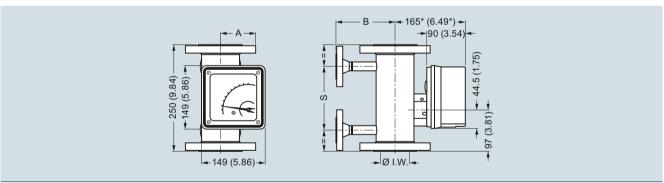
### Dimensional drawings



EN 1092-1	EN 1092-1		ANSI B16.5		I. W.		A		Weight	
				mm	inch	mm	inch	kg	lb	
DN 15	PN 40	1/2"	class 150	26	1.02	74	2.91	3.0	6.6	
DN 20	PN 40	3/4"	class 150	26	1.02	74	2.91	3.0	6.6	
DN 25	PN 40	1"	class 150	32	1.26	77	3.03	4.2	9.3	
DN 32	PN 40	11/4"	class 150	32	1.26	77	3.03	5.2	11.5	
DN 40	PN 40	1½"	class 150	46	1.81	88	3.46	6.0	13.2	
DN 50	PN 40	2"	class 150	70	2.76	97	3.82	7.5	16.5	
DN 65	PN 16	21/2"	class 150	70	2.76	97	3.82	8.5	18.7	
DN 80	PN 16	3"	class 150	102	4.02	113	4.45	13	28.7	
DN 100	PN 16	4"	class 150	125	4.92	126	4.96	18	39.7	

<sup>\* +100</sup> mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of display unit made of aluminum, dimensions in mm (inch)



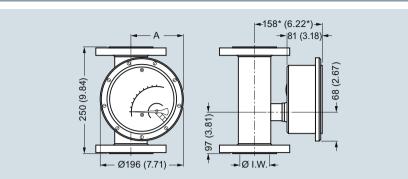
Nominal diameter		B (flange)	(flange)			S		Weight	
		mm	inch	mm	inch	mm	inch	kg	lb
DN 15	1/2"	110	4.33	53	2.09	150	5.91	3.0	6.6
DN 20	3/4"	110	4.33	53	2.09	150	5.91	3.0	6.6
DN 25	1"	110	4.33	58.5	2.3	150	5.91	4.2	9.3
DN 32	11/4"	110	4.33	58.5	2.3	150	5.91	5.2	11.5
DN 40	11/2"	130	5.12	63	2.48	150	5.91	6.0	13.2
DN 50	2"	140	5.51	77.5	3.05	150	5.91	7.5	16.5
DN 65	21/2"	140	5.51	77.5	3.05	150	5.91	8.5	18.7
DN 80	3"	160	6.3	93.5	3.68	150	5.91	13	28.7
DN 100	4"	175	6.89	110	4.33	120	4.72	18	39.7

<sup>\* +100</sup> mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of dislay unit made of aluminum with heating connection, dimensions in mm (inch)

SITRANS F VA

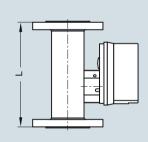
### SITRANS FVA250 variable area meter



EN 1092-1		ANSI B16.5		I. W.	I. W. A		Gewicht		
				mm	inch	mm	inch	kg	lb
DN 15	PN 40	1/2"	class 150	26	1.02	103	4.06	3.0	6.6
DN 20	PN 40	3/4"	class 150	26	1.02	103	4.06	3.0	6.6
DN 25	PN 40	1"	class 150	32	1.26	105	4.13	4.2	9.3
DN 32	PN 40	11/4"	class 150	32	1.26	105	4.13	5.2	11.5
DN 40	PN 40	11/2"	class 150	46	1.81	115	4.53	6.0	13.2
DN 50	PN 40	2"	class 150	70	2.76	129	5.08	7.5	16.5
DN 65	PN 16	21/2"	class 150	70	2.76	129	5.08	8.5	18.7
DN 80	PN 16	3"	class 150	102	4.02	145	5.71	13	28.7
DN 100	PN 16	4"	class 150	125	4.92	158	6.22	18	39.7

<sup>\* +100</sup> mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of display unit made of stainless steel, dimensions in mm (inch)



Nominal	EN 1092-1	EN 1092-1				ANSI B16.5		
diameter	PN 16	PN 40	PN63	PN100	diameter	class 150	class 300	class 600
DN 15	-	250 (9.84)	-	250 (9.84)	1/2"	250 (9.84)	250 (9.84)	250 (9.84)
DN 20	-	250 (9.84)	-	250 (9.84)	3/4"	250 (9.84)	250 (9.84)	250 (9.84)
DN 25	-	250 (9.84)	-	250 (9.84)	1"	250 (9.84)	250 (9.84)	250 (9.84)
DN 32	-	250 (9.84)	-	250 (9.84)	11/4"	250 (9.84)	250 (9.84)	250 (9.84)
DN 40	-	250 (9.84)	-	250 (9.84)	1½"	250 (9.84)	250 (9.84)	250 (9.84)
DN 50	-	250 (9.84)	250 (9.84)	300 (11.81)	2"	250 (9.84)	250 (9.84)	300 (11.81)
DN 65	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	21/2"	250 (9.84)	300 (11.81)	300 (11.81)
DN 80	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	3"	250 (9.84)	300 (11.81)	300 (11.81)
DN 100	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	4"	250 (9.84)	300 (11.81)	300 (11.81)

<sup>-</sup> not available

Build-in length of fitting in dependance of nominal diameter and pressure rating, dimensions mm (inch)

# Flow Measurement SITRANS F VA

### SITRANS FVA250 variable area meter

Selection and order		Article No.
SITRANS FVA250 F	ull metal variable area meter	7 M E 5 8 6
✓ Click on the Article  Article  Output  Description  Output  Description  Output  Description  Output  Description  Output  Description  Description  Output  Description  Descripti	e No. for the online configuration in the PIA Life Cycle Portal.	
low tube		
<u>Liquid</u> 5 40 l/h 50 600 l/h 1 000 4 000 l/h 2.5 6 m <sup>3</sup> /h	<u>Gas</u> 0.15 1.3 m <sup>3</sup> /h 1.5 17 m <sup>3</sup> /h 30 110 m <sup>3</sup> /h 70 170 m <sup>3</sup> /h	1 2 3 4
4 25 m <sup>3</sup> /h 16 50 m <sup>3</sup> /h 60 100 m <sup>3</sup> /h	30 700 m <sup>3</sup> /h 460 1 350 m <sup>3</sup> /h 1 700 3 000 m <sup>3</sup> /h	5 6 7
Float: Hastelloy Type: FF-P Fitting: Stainless stee Flange: Stainless stee Float: PTFE	il 1.4404/316L, el 1.4404/316L 1.4404/316L el 1.4404/316L, el 1.4404/316L with Hastelloy lining	2 4 5
Nominal diameter		
DN 15/ANSI ½" DN 20/ANSI ¾" DN 25/ANSI 1"		A B C
DN 32/ANSI 1¼" DN 40/ANSI 1½" DN 50/ANSI 2"		D E F
DN 65/ANSI 2½" DN 80/ANSI 3" DN 100/ANSI 4"		G H J
Female thread ¼" Female thread 3/8" Female thread ½" Female thread ¾"		Q R S T
Female thread 1" Female thread 1½" Female thread 1½" Female thread 2"		U V W X
Flange/thread stand	lard - pressure rate	
EN 1092-1, PN 16, Fo EN 1092-1, PN 40, Fo EN 1092-1, PN 63, Fo EN 1092-1, PN 100, F	orm B1 orm B2	B D E F
ANSI B16.5, class 15 ANSI B16.5, class 30 ANSI B16.5, class 60	00 RF	J K L
Female thread G DIN Female thread NPT A		T N

SITRANS F VA

### SITRANS FVA250 variable area meter

Selection and orderi	ng data			Article No.
SITRANS FVA250 Fu	Il metal variable area me	ter		7 M E 5 8 6
Measuring ranges				
Liquids		Gases		
I/h	(USgpm)	m <sup>3</sup> /h	(scfm)	
0.5 5	(0.0022 0.022)	0.015 0.15	(0.0088 0.088)	1 0
0 10	(0.0044 0.044)	0.03 0.3	(0.0177 0.177)	11
1.6 16	(0.007 0.07)	0.045 0.45	(0.0265 0.283)	1 2
2.5 25	(0.011 0.11)	0.075 0.75	(0.0441 0.441)	1 3
4 40	(0.018 0.18)	0.13 1.3	(0.0765 0.765)	1 4
5 50	(0.022 0.22)	0.15 1.5	(0.0883 0.883)	1 5
7 70	(0.031 0.31)	0.2 2	(0.12 1.24)	1 6
10 100	(0.044 0.44)	0.3 3	(0.177 1.77)	17
16 160	(0.07 0.7)	0.5 5	(0.29 2.71)	2 0
25 250	(0.11 1.1)	0.7 7	(0.412 4.12)	2 1
40 400	(0.176 1.76)	1.0 11	(0.589 6.47)	2 2
60 600	(0.264 2.64)	1.7 17	(1 10)	2 3
100 1 000	(0.44 4.4)	2 30	(1.77 17.66)	2 4
160 1 600	(0.7 7)	3 46	(2.35 27.07)	2 5
250 2 500	(1.1 11)	6 70	(4.12 41.2)	2 6
400 4 000	(1.76 17.6)	10 110	(6.47 64.74)	27
600 6 000	(2.64 26.4)	16 170	(10 100)	
1 000 10 000	(4.4 44)	28 290	(17.1 170.7)	3 1
1 600 16 000	(7 70)	45 460	(27.1 270.7) (32.4 323.7)	3 2 3 3
2 000 20 000	(8.8 88	55 550	, ,	3 3 4
2 500 25 000	(11 110)	69 700	(41.2 412)	
4 000 40 000 5 000 50 000	(17.6 176) (22 220)	109 1 100 134 1 350	(64.7 647.4) (79.5 794.6)	3 5 3 6
6 000 60 000	(26.4 264)	169 1 700	(100 1 000)	3 7
				4 0
8 000 80 000 10 000 100 000	(35.2 352) (44 440)	239 2 400 299 3 000	(141.3 1 413) (176.6 1 766)	4 1
	, ,	233 3 000	(170.0 1700)	
Display unit / proces	s temperature - up to 200 °C with local d	enlay/150 °C with alac	trical output	0
,	•	, ,	lisplay and electrical outputs	1
, ,	up to 200 °C with local dis			2
	•		play and electrical outputs	3
Heating/cooling shea	ath			<del></del>
Without (standard)				A
With flange connectio	n EN1092-1 DN 15 PN 40			В
With flange connectio	n ½ " ANSI B16.5 Class 15	50 RF		C
Display/outputs				
With display				A
	ve contact (limit switch) S			В
	ve contacts (limit switches	s) SJ 3.5N		C
With display, HART ar		O L O ENI		D
	to 20 mA, 2 inductive cont			E   F
With display, PROFIBI	to 20 mA, 1 inductive conf	acı, i puise output		G
Calibration	3017			
Standard calibration				
Without calibration of	certificate			0
With calibration cert				Ĭ

# Flow Measurement SITRANS F VA

### SITRANS FVA250 variable area meter

Selection and ordering data	Order code
Other types of liquid <u>and</u> gas measurement	
Please add "-Z" to Article No. and specify Order code.	
Marking of name plate	_
Name plate in English	B11
Certificates	
Certificate of compliance EN 10204-2.1	C10
Factory inspection certificate EN 10204-2.2	C11
Acceptance test certificate 3.1 according to EN 10204	C12
Dye penetration test on pressure bearing weldings	C13
K-ray test of pressure bearing weldings	C14
Pressure test with acceptance test certificate 3.1 according to EN 10204	C15
PMI (positive material identification) test of pressure bearing metal parts	C16
Float damping	
Nith float damping	D01
Specification of medium process data (specify in plain text)	
Specification always required for each order:  Medium  Derating pressure  Departing temperature  Density (only for customer-specified medium)  Viscosity (only for customer-specified medium)  Measuring range	Y01
ΓAG plate	
TAG plate in stainless steel (add plain text)	Y17
Cleaning to company standard	
Cleaning Class 2, with identification free of oil and grease	K46
Cleaning Class 1, with identification free of oil, grease and silicon	K48
Approvals	
Nith ATEX approval	M51
Special version (specify in plain text)	Y99

### SITRANS F O delta p - Primary differential pressure devices

#### **Technical description**

#### Primary differential pressure devices to DIN EN ISO 5167

		Nominal diameters	Nominal pressure
	Orifice plates with annular chambers	EN: DN 50 DN 1000 ASME: 2 inch 40 inch	EN: PN 6 PN 100 ASME: Class 150 600
-0-	Orifice plates with single tappings	EN: DN 50 DN 500 ASME: 2 inch 20 inch	EN: PN 6 PN 315 ASME: Class 150 2500
	Metering pipe		
	Orifice plate with annular chambers, mounted between flanges	EN: DN 10 DN 50 ASME: ½ inch 2 inch	EN: PN 10 PN 100 ASME: Class 150 600

### Further products for the complete setup for flow measurements with a primary differential pressure device,

#### e. g. an orifice plate



For **compensation vessels** (for steam), see chapter 1

For threaded flange pairs, see chapter 1

For initial shut-off valves, see chapter 1

.

For valve manifolds, see chapter 1 e. g.

5-spindle valve manifold or



Valve manifold combination DN 8 for vapor measurement

For SITRANS P DS III differential pressure transmitter, see chapter 1

Measuring cell options: 20, 60, 250, 600 and 1600 mbar



### Overview

Primary differential pressure devices are standardized mechanical flow sensors, often also referred to as differential pressure transducers. The primary differential pressure devices are calculated and manufactured according to DIN EN ISO 5167.

Through constriction of the line diameter in the pressure device, the flow rate creates a differential pressure that is converted with the help of a differential pressure transmitter into a proportional current signal or flow value. The assignment of differential pressure to flow is created by means of a "calculation of the primary differential pressure device".

Primary differential pressure devices are suitable for singlephase media such as gas, vapor and liquids without solid components.

## Requirement when ordering a primary differential pressure device

Always quote the orifice plate calculation and the classification according to the pressure equipment directive 97/23/EC (PED) when placing an order.

### Orifice plate calculation - calculation protocol

For the "orifice plate calculation" service, you need to fill out the "Questionnaire for calculation of a primary differential pressure device according to DIN EN ISO 5167". The intelligent "SITRANS F O questionnaire online" can be found in the PIA Life Cycle Portal at http://www.siemens.com/pia-portal.

For this purpose, you need to specify all the data of the measuring point, medium, process and pipe data, as well as details of installation conditions, flow conditions, permissible pressure losses and accuracy requirements.

We will be unable to carry out the calculation if there are any data missing. A calculation protocol with a consecutive number documents the calculation of the orifice plate. We require this calculation protocol from the customer for manufacturing purposes. It is to be included in the order for the orifice plate.

### Important note:

The "Orifice Plate Calculation with Preparation of a Calculation Protocol" service is a separate process, and must be carried out before the orifice plate is ordered.

The calculation protocol issued by the customer is to be included in the order for the orifice plate.

### SITRANS F O delta p - Primary differential pressure devices

**Technical description** 

## Classification in accordance with pressure equipment directive 97/23/EC (PED)

The pressure equipment directive must also be applied to the Orifice portfolio for use in Europe.

In compliance with the pressure equipment directive, equipment is divided into categories I to III or Article 3 paragraph 3 according to danger potential (medium/pressure/volume/nominal diameter).

Submission of this design data in accordance with pressure equipment directive 97/23/EC is mandatory for ordering and manufacture, and must be specified by customers in the orifice plate order.

The Article No. of the orifice plate contains the relevant Category I, II, III or Article 3 paragraph 3 in the Order code.

Detailed information is available under "Pressure equipment directive 97/23/EC".

## How to order the "Orifice plate with appended calculation protocol" product

To order an orifice plate, you need to supply the following data:

- Complete Article No. of the orifice plate, including the respective Order code "Manufacture according to pressure equipment directive":
  - Category I, II, III or Article 3 paragraph 3 and the design data with Order Codes Y31 to Y35
  - Or without (only available outside Europe!)
- Appended "Calculation Protocol" issued by the customer with Order Code Y21 or Y22, or statement "Orifice plate without calculation" with Order Code Y01

The orifice plate can only be manufactured when it has been passed as a "clean order", i. e. it has been confirmed that the data of the Article No. match the data of the calculation protocol.

### Benefits

- Primary differential pressure devices are suitable for universal use across the globe.
- Primary differential pressure devices are very robust and can be used in a wide range of nominal diameters.
- Suitable for high temperature and pressure ranges.
- No wet calibration required as they use an internationally standardized flow rate measurement procedure.
- The differential pressure transmitter can be used over a long distance from the measuring location.
- The differential pressure method is well known and has a large installed base.
- The SITRANS P differential pressure transmitter is easy to parameterize again if process data change. They are adapted by recalculating and assigning new parameters to the transmitter or, in the case of the version orifice plate with annular chamber, by using a new orifice disk.

#### Application

#### Power stations

Measurement of steam, condensate and water.

### Petrochemical industry/Refineries

Measurement of water, steam and liquid and gas hydrocarbons.

#### Chemical industry

Measurement of various liquid and gas media.

### Oil and gas industries

Measurement of liquid and gas hydrocarbons.

### Design

#### Orifice plate with annular chambers

The version orifice plate with annular chambers comprises two support rings which are connected to the inside of the pipe over an annular chamber and an annular gap. Tapping sockets direct the differential pressure from the support rings to the differential pressure transmitter over shut-off fittings and differential pressure lines.

The orifice disk is inserted between the support rings together with a gasket.

#### Orifice plate with single tappings

In the version of the orifice plate with single tappings the orifice plate is a single unit. The inside of the tube is connected to the tapping sockets by two single tappings.

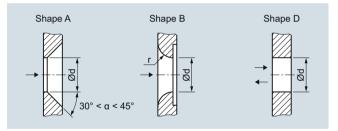
Both types of orifice plate are installed between two flanges in the pipeline.

#### Function

#### Mode of operation

The orifice plate creates a differential pressure. The pressure is transferred through the vertical columns of medium in the differential pressure lines to the measuring cell of the differential pressure transmitter. The transmitter converts the pressure signal with square-root characteristic into a flow-proportional current or into a digital signal, e. g. PROFIBUS.

### Types of primary differential pressure devices



Shapes of the orifice disk aperture

The primary differential pressure devices are calculated and manufactured according to DIN EN ISO 5167. According to this, the application range of the standard orifice disk aperture form A is limited by the Reynolds number. The limits depend on the diameter ratio  $\beta$  = d/D. (D: internal diameter of pipe).

In the case of Reynolds numbers from approx. 500 to  $2.5 \times 10^5$  and DN 40 to DN 150, the orifice disk aperture form B (quarter circle) can be used for slightly less accurate measurements. The profile radius r depends on the diameter ratio  $\beta$  and results from the calculation of the diameter of the orifice disk aperture d.

The cylindrical orifice disk aperture form D is used for measurements in both flow directions.

### SITRANS F O delta p - Primary differential pressure devices

#### **Technical description**

#### Tapping sockets

Type of threaded connections and welding connections dependent on the measured medium and the nominal pressure of the shut-off fitting

The type of socket connections depends on the measured medium and the nominal pressure of the shut-off fittings; the socket length depends on the nominal diameter (pipe diameter) of the primary differential pressure device and the operating temperature (because of the thermal insulation!). The socket position depends on the measured medium and the flow direction.

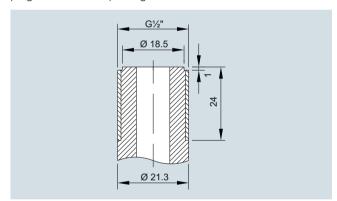
- With threaded connection G½ DIN ISO 228/1, connection dimensions to DIN 19207 Form V, for liquids and gases up to PN 160, for steam up to PN 100
- With threaded connection ½-14 NPT male, for version acc. to ASME up to class 600
- With Ø 12 mm pipe connection for pipe union with ferrule
- With Ø 21.3 mm welding connection for liquids and gases up to PN 400, and for steam up to PN 100, or Ø 24 mm for liquids and gases over PN 400, and for steam over PN 100

Other connections on request.

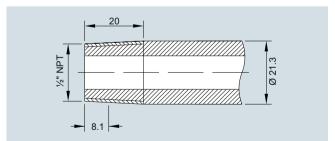
#### Length of tapping sockets

The length of the tapping sockets are specified in DIN 19205, Part 2.

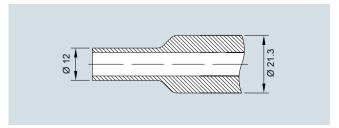
If using with high temperatures and stronger insulations, please quote the insulation thickness and the required length of the tapping sockets when placing an order.



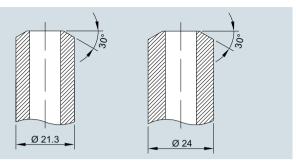
Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100, dimensions in mm



Threaded connection ½-14 NPT male, dimensions in mm



With Ø 12 mm pipe for pipe union with ferrule, dimensions in mm

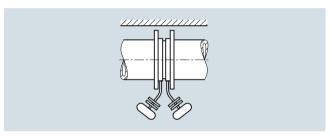


Welding connections of tapping sockets, dimensions in mm

#### Position of the tapping sockets

When measuring liquids and gases, the position of the tapping sockets must comply with the tables according to DIN 19205; when measuring steam, the compensation vessels must be at the same height.

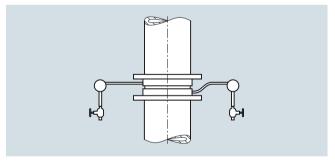
· Horizontal steam lines



Horizontal steam line in front of a wall with primary differential pressure device and valve combination; with annular chamber orifice plate or single part orifice plate with special length of 65 mm

In the case of horizontal steam lines, straight sockets are arranged opposite each other or, if the pipe is close to a wall, with bent sockets on one side.

· Vertical steam lines



Vertical steam line with primary differential pressure device and valve

In the case of vertical and inclined steam lines, the lower socket is bent upwards so that the connection flanges and compensation vessels are also at the same height.

### SITRANS F O delta p - Primary differential pressure devices

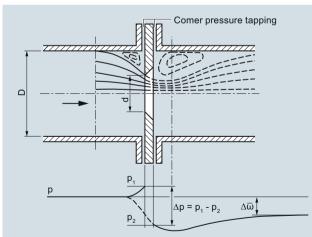
#### **Technical description**

### Extract from DIN 19205, Part 1, August 1988

No.	Pipe position and direction	l flow	Position of the tap- ping sock- ets		Applica- tion
1	Horizontal	$\rightarrow$	180°	-0-	With com- pensation vessels
2 1)2)			0°	—	
3 1) 2)				<u> </u>	
4	Vertical Rising	$\uparrow$	90°		
5	Falling	<b>\</b>		$\overline{}$	
6	Rising	1	180°		
7	Falling	<b>\</b>			
10	Horizontal	$\rightarrow$	<γ <sup>3)</sup>	X	Without compen- sation vessels
11	Horizontal, vertical	$\overrightarrow{\uparrow}$	180°	<del>-</del>	
13	Vertical	↓↑	90°	-	

 $<sup>^{1)}</sup>$  Not possible with orifice plates with single tappings (overall length 40 mm). Special length of 65 mm is possible.

### Principle of the differential pressure method



- D Internal diameter of pipe
- d Diameter of orifice disk aperture
- p Pressure in the pipe
- p<sub>1</sub> Pressure immediately upstream of primary device
- Pressure immediately downstream of primary device
- Δp Differential pressure
- $\Delta \overline{\omega}$  Remaining pressure loss

Principle of the differential pressure method: Pressure curve at a pipe restriction

A primary differential pressure device is installed at the measuring point to measure the flow. This restricts the pipe and has two connections for sampling the differential pressure. If the properties of the primary device and the medium are known such that

the equation below can be evaluated, the differential pressure is a measure of the absolute flow. No reference measurements are required; the flow measurement can be checked independent of the device manufacturer.

The differential pressure method is based on the law of continuity and Bernoulli's energy equation.

According to the law of continuity, the flow of a moving medium in a pipeline is the same at all points. If the cross-section is reduced at one point, the flow velocity must increase at this point. According to Bernoulli's energy equation, the energy content of a flowing medium is constant and is the total of the static (pressure) and kinetic (movement) energies. An increase in the flow rate therefore results in a reduction in the static pressure (see the figure "Principle of the differential pressure method: Pressure curve at a pipe restriction"). This pressure difference  $\Delta p$ , the so-called differential pressure, is a measure of the flow.

In general the following equation applies:  $q = c\sqrt{\Delta p}$ 

#### Where:

- q: flow (q<sub>m</sub>, q<sub>v</sub>) mass flow or volume flow
- Δp: Differential pressure
- c: Factor depending on the dimensions of the pipeline, the type of constriction, the density of the flowing medium etc.

According to this equation, the differential pressure created by the constriction is proportionally equal to the square of the flow (see the figure "Relationship between flow q and differential pressure  $\Delta p$ ").

### Integration

The orifice plate is installed between two flanges in the pipeline. Using compensation vessels (for steam) and initial shut-off valves, the differential pressure of the high-pressure side and low-pressure side is directed through differential pressure lines to a multiple valve manifold and on to the differential pressure transmitter. For media with extreme pressure and temperature fluctuations it makes sense to take an additional measurement of the pressure and temperature in order to correct the flow signal of the transmitter in a subsequent correction computer.

### Selection of mounting point

The flow measuring regulations DIN EN ISO 5167 not only consider the design of primary differential pressure devices, but also assume that their installation is in accordance with the standard so that the specified tolerances can be retained. The required inlet and outlet pipe sections according to ISO 5167 can be found in the calculation protocol of the respective orifice plate. Configuration of the pipeline should allow for standardized installation (required inlet and outlet pipe section). Particular attention must be paid to ensure that the primary device can be fitted in a sufficiently long straight section of pipe. Bends, valves and similar should be fitted sufficiently far upstream of the primary device to prevent them having a detrimental effect. Primary devices with a large diameter ratio are particularly sensitive to interferences.

### Design of measuring point

The design of the measuring point depends on the medium and on the spatial conditions. The designs for gas and water only differ with regard to the position of the tapping sockets (see the figure "Measuring setup"); compensation vessels must also be provided for steam.

### Metering pipes

On lines with small nominal diameters (DN 10 to DN 50) the measurements are influenced by the wall roughness and diameter tolerances of the pipes, far more so than by large nominal diameters. These influences are counteracted by using metering pipes with fitting inlet and outlet pipe sections made of precision pipes. For exact measurements with metering pipes, the flow coefficient C needs to be determined by means of calibration.

<sup>&</sup>lt;sup>2)</sup> Only possible with orifice plates with annular chambers (overall length 65 mm) with bent tapping sockets.

 $<sup>^{\</sup>rm 3)}$  Angle  $\gamma$  is dependent on the nominal pressure and nominal diameter in accordance with DIN 19 205.

SITRANS F O delta p - Primary differential pressure devices

### **Technical description**

### Options

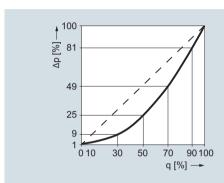
Further versions that are available on request:

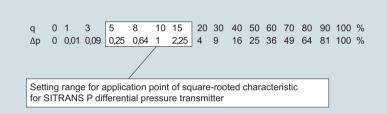
- Other types of primary differential pressure device: orifice plates without support rings, measurement flange orifice plates, venturi nozzles, classic venturi tubes etc.
- Other nominal diameters and nominal pressures to EN and ASME
- Other lengths, special lengths

- · Other materials
- Sealing face with recess or groove
- Flushing rings
- Other tapping sockets, multiple tappings
- Material acceptance test certificates or cold water pressure tests

### Characteristic curves

The orifice plate has a square-law relationship between differential pressure and flow. A square-root transmitter is required therefore to create a linear flow characteristic.





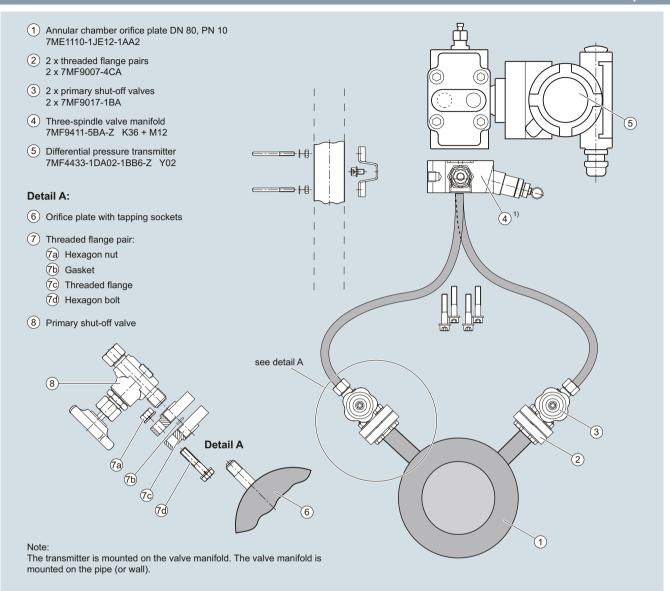
Relationship between flow q and differential pressure  $\Delta p$ 

### More information

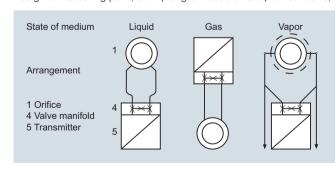
- Standards
- Instruction Manual SITRANS P
- Installation Instructions

### SITRANS F O delta p - Primary differential pressure devices

### **Technical description**



Design of measuring point, example: gas measurement (non-corrosive, non-hazardous)



Measuring setup

### Technical specifications

The technical properties of the orifice plates depend on the device:

- Nominal diameters
- Nominal pressure
- Materials
- Mass
- · Temperature limits

### Accessories

- Compensation vessels
- Threaded flange pairs
- Primary shut-offs
- Valve manifold
- Differential pressure lines (to be provided by the plant owner)
- Gaskets, bolts, screws (to be provided by the plant owner)
- Differential pressure transmitter

### SITRANS F O delta p - Primary differential pressure devices

#### Pressure equipment directive 97/23/EC

### Overview

The pressure equipment directive 97/23/EC applies to the alignment of the statutory orders of the European member states for pressure equipment used within its European area of validity. Equipment as defined by the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than 0.5 bar above atmospheric pressure.

Application of the pressure equipment directive was optional from November 29, 1999 onwards and has been mandatory since May 29, 2002.

#### Categorization according to danger potential

In compliance with the pressure equipment directive, equipment is divided into categories I to III or Article 3 paragraph 3 according to danger potential (medium/pressure/volume/nominal diameter).

The following criteria are decisive for assessment of the danger potential and are also shown in the diagrams (see "Characteristic curves").

Fluid group

Aggregate state

Type of pressurized equipment

D: !!

• Pipeline

Group 1 or 2

Liquid or gaseous

Nominal diameter, pressure or product of pressure and nominal diameter (PS \* DN)

#### Note

Liquids according to Article 3 are those liquids whose steam pressure is not more than 0.5 bar above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The maximum permissible temperature for the liquids used is the user-defined maximum process temperature. This must be within the limits defined for the equipment.

### Categorization of media (liquid/gaseous) into fluid groups

In compliance with Article 9, fluids are divided into the following fluid groups:

#### Group 1



Explosive R phrases:

e. g.: 2, 3 (1, 4, 5, 6, 9, 16, 18, 19, 44)



Very toxic R phrases:

e. g.: 26, 27, 28, 39 (32)



Extremely flammable R phrases:

e. g.: 12 (17)



Toxic R phrases:

e. g.: 23, 24, 25 (29, 31)



Highly flammable R phrases:

e. g.: 11, 15, 17 (10, 30)



Oxidizing R phrases: e. g.: 7, 8, 9 (14,

Flammable (where the maximum allowable temperature is above flash-point).

#### Group 2

All fluids not belonging to Group 1.

Also applies to fluids which are e. g. dangerous to the environment, corrosive, dangerous to health, irritant or carcinogenic (if not highly toxic).

#### Conformity rating

Pressure equipment of categories I to IV must comply with the safety requirements of the directive and be assigned the CE symbol.

They must comply with a conformity rating procedure according to Appendix III of the directive.

Pressure equipment according to Article 3 paragraph 3 must be designed and manufactured in agreement with the sound engineering practice SEP applicable in a member country, and must not be assigned a CE symbol (CE symbols from other directives are not affected).

The manufacturer issues a declaration of conformity if the orifice plates are produced for use in the area covered by the PED and are assignable to the categories I, II or III. This declaration of conformity is given to the customer. Its contents depend on the design data of the customer's plant. The design data can only be provided by the operator/customer, and must be specified in the product order for the orifice plate.

Submission of the following design data is mandatory:

- Medium (name)
- Aggregate state (liquid or gas)
- Fluid group 1 or 2
- Max. permissible pressure (PS) of the plant (not PN)
- Max. permissible temperature TS of the plant (not operating temperature)
- Nominal diameter DN

#### Note

Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).

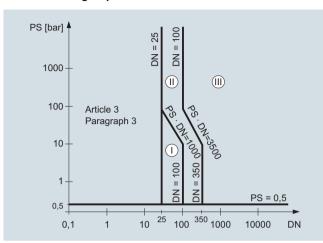
The pressure equipment directive according to Article 1 paragraph 3 does not apply to equipment such as e. g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

Pressure equipment directive 97/23/EC

### SITRANS F O delta p - Primary differential pressure devices

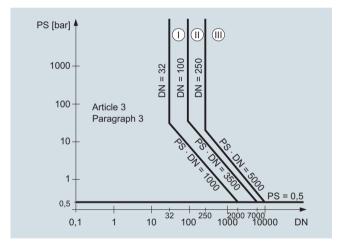
### Characteristic curves

### Gases of fluid group 1



Pipelines according to Article 3 Number 1.3 Letter a) First dash Exception: Unstable gases (e.g. acetylene and ethylene) belonging to Categories I and II, must be included in Category III

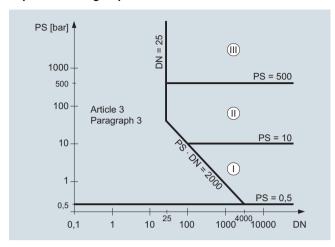
### Gases of fluid group 2



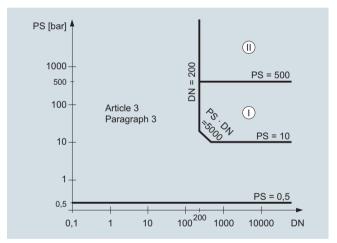
Pipelines according to Article 3 Number 1.3 Letter a) Second dash

Exception: Liquids and steam, at temperatures > 350 °C belonging to Category II must be included in Category III.

### Liquids of fluid group 1



Pipelines according to Article 3 Number 1.3 Letter b) First dash Liquids of fluid group 2



Pipelines according to Article 3 Number 1.3 Letter b) Second dash

SITRANS F O delta p - Primary differential pressure devices

### Pressure equipment directive 97/23/EC

### Design data and product order for orifice plate

If the orifice plate is used in Europe the orifice plate is produced in accordance with the Pressure Equipment Directive 97/23/EC.

In this case the design data are mandatory for the production of an orifice plate and must be specified when ordering.

The required design data are specified in the article number of an orifice plate with the Order code Y31 to Y35.

The following design data are mandatory; data can only be provided by the operator/customer:

Data for prod	uction according to Pressure Equipment	Directive 97/23/EC - fo	r use in Europe	
Order code for ordering	Design data			
Y31	Medium/measured medium	Name		
Y32	Aggregate state	Liquid 🗌	Gaseous	
Y33	Fluid group     Explosive     Highly, extremely flammable     Oxidizing     Toxic, highly toxic	Group 1	All others	Group 2 🗌
Y34	• Maximum permissible pressure (not PN)	PS <sup>1)</sup>		bar _ psi
Y35	- at the maximum permissible temperature	TS <sup>2)</sup> ———		——□°C □°F
	1) PS: Setting pressure of the safety mec 2) TS: Range of the temperature limits	hanism (valve, bursting o	disk)	
The following ar	e already defined by the article number:			
	Nominal diameter	DN		
	Assignment of the category     Annex II of the Pressure Equipment Direct mary differential pressure devices can be			sociated category of the pri-
	Article 3, Paragraph 3	Category II		
	☐ Category I ☐ C	ategory III		

### SITRANS F O delta p - Primary differential pressure devices

### SITRANS F O questionnaire online

### Overview

### SITRANS F O questionnaire online

For the calculation of a primary differential device in accordance with DIN EN ISO 5167 and for the production of primary differential devices in accordance with the Pressure Equipment Directive 97/23/EC the required data (measuring point and customerspecific data) can be entered in the "SITRANS F O questionnaire online".

The intelligent "SITRANS F O questionnaire online" can be found in the PIA Life Cycle Portal at:

http://www.siemens.com/pia-portal.

All the data required for calculating a primary differential device - orifice plates, nozzles, Venturi nozzles and the classic Venturi tube - can be entered here and attached to the order for calculation of an orifice plate as a Microsoft Excel file.

All the necessary data for calculating a primary differential device are requested menu-driven and can be verified by a check function.

Numerous new features provide the user with essential benefits when using the questionnaire online:

- Clear structure of all necessary parameters
- Menu-driven input of data and values through automatic specification of parameters and units, in accordance with the selected design, the given measured medium and the selected optimization criterion.
- Explanatory and in-depth notes as description and explanation of the parameter
- Numerous input options of customer and measuring point specific supplementary conditions
- Verification of all mandatory input boxes
- Safe data storage of entered customer-specific parameters
- Print preview and print template
- Immediate dispatch of the completed questionnaire online by e-mail

SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with annular chamber

### Application



Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +400°C.

### Design

- Two support rings with replaceable orifice disk form A, B or D (see types of primary differential pressure devices in "Technical description", "Function"); see Ordering data for materials
- Graphite gasket with noncorrosive metal foil insert between orifice disk and support ring outlet

### Overall length

65 mm to DIN 19205

#### Nominal diameters

EN: DN 50 to DN 1000 ASME: 2 inch to 40 inch

#### Nominal pressure

EN: PN 6 to PN 100 ASME: class 150 to 600

### Sealing face to the mating flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for version to ASME

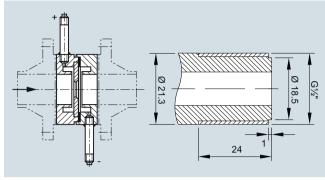
### Tapping sockets

For the dimensions of the following tapping sockets, see "Function":

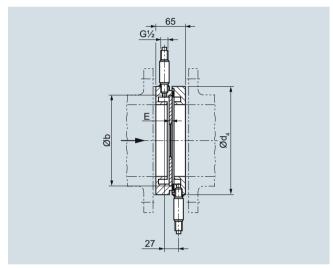
- With connection thread G½ DIN ISO 228/1, connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to ASME
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection Ø 21.3 mm

See "Technical description" and "Function" for position of the tapping sockets.

### Dimensional drawings



Orifice plate with annular chamber (above); tapping socket with threaded connection (below), dimensions in mm



Tapping socket: Socket length is fixed in accordance with the pressure and nominal diameter (DIN 19 205, Part 2).

- Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100, dimensions in mm

Versions for steam lines: See "Technical description", "Function" for position of the tapping sockets.

### SITRANS F O delta p - Primary differential pressure devices

Orifice plate with annular chamber

### Nominal diameter acc. to EN

DN	Inside diameter	External d	External diameter d <sub>4</sub> / sealing face: plane, with recess or with groove.								
		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100			
50	43 55	96	107	107	107	107	113	119			
65	59 71	116	127	127	127	127	138	144			
80	73 85	132	142	142	142	142	148	154			
100	90 108	152	162	162	168	168	174	180			
125	114 132	182	192	192	194	194	210	217			
150	142 160	207	218	218	224	224	247	257			
200	185 211	262	273	273	284	290	309	324			
250	237 262	317	328	329	340	352	364	391			
300	285 314	373	378	384	400	417	424	458			
350	328 362	423	438	444	457	474	486	512			
400	380 408	473	489	495	514	546	543	-			
500	477 514	578	594	617	624	628	-	-			
600	581 610	679	695	734	731	-	-	-			
700	686 710	784	810	804	833	_	-	-			
800	776 810	890	917	911	942	-	-	-			
900	876 910	990	1017	1011	1042	-	-	-			
1000	976 1010	1090	1124	1128	1154	-	-	-			

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1, dimensions in mm and weights

DN	L				E	Weight (approx	. in kg)
	PN 6	PN 10 25	PN 40	PN 63 100	PN 6 100	With smallest nominal pressure	With largest nominal pres- sure
50	79	79	79	79	2 ± 0.2	2.5	4.5
65	96	96	96	96	2 ± 0.2	3.4	6.4
80	115	115	115	115	4 ± 0.2	4.3	6.9
100	137	137	137	137	4 ± 0.25	4.7	8.6
125	164	164	164	164	4 ± 0.25	6.3	12.4
150	193	193	193	193	4 ± 0.29	7.0	17.0
200	247	247	247	247	4 ± 0.29	10.3	26.2
250	302	302	302	302	4 ± 0.32	13.1	36.6
300	354	354	354	354	4 ± 0.36	17.3	49.0
350	403	403	403	403	4 ± 0.4	25.0	63.0
400	452	452	452	452	4 ± 0.4	28.0	73.8
500	553	563	563	_	6 ± 0.4	36.2	65.9
600	659	659	_	_	6 ± 0.4	42.5	75.6
700	757	762	_	_	8 ± 0.4	51.8	89.5
800	869	875	-	_	8 ± 0.4	61.7	109
900	969	975	_	_	8 ± 0.4	68.3	123
1000	1071	1079	-	_	10 ± 0.4	74.0	148

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1. dimensions in mm and weights (contd.)

SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with annular chamber

### Nominal diameter acc. to ASME

ASME	External dia sealing face	meter d4 / e: Plane. RF (ra	nised faced)	L			E		Weight (approx. in kg)	
	Class 150	Class 300	Class 600	Class 150	Class 300	Class 600	Class 150 600	With small- est nominal pressure	With largest nominal pressure	
2 inch	105	111	111	79	79	79	2±0.2	2.5	4.5	
2½ inch	124	130	130	96	96	96	2±0.2	3.4	6.4	
3 inch	137	149	149	115	115	115	4±0.2	4.3	6.9	
4 inch	175	181	194	137	137	137	4±0.2	4.7	8.6	
5 inch	197	216	241	164	164	164	4±0.25	6.3	12.4	
6 inch	222	251	267	193	193	193	4±0.29	7.0	17.0	
8 inch	279	308	321	247	247	247	4±0.29	10.3	26.2	
10 inch	340	362	400	302	302	302	4±0.32	13.1	36.6	
12 inch	410	422	457	354	354	354	4±0.36	17.3	49.0	
14 inch	451	486	492	403	403	403	4±0.4	25.0	63.0	
16 inch	514	540	565	452	452	452	4±0.4	28.0	73.8	
20 inch	549	597	613	553	563	563	6±0.4	36.2	65.9	
24 inch	717	775	790	659	659	-	6±0.4	42.5	75.6	

Orifice plates with annular chambers for installation between ASME flanges to ASME B16.5, dimensions in mm and weights

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with annular chamber

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No. Order code
Orifice plate with annular	7 ME 1 1 1 0 1		Orifice plate with annular	7 ME 1 1 1 0 1 1
chambers			chambers	
for mounting between flanges			DN 350	
Sealing faces to the mating			PN 6	2 H A
flanges: plane.			PN 10	2 HB
→ Click on the Article No. for			PN 16	2 H C
the online configuration in the PIA Life Cycle Portal.			PN 25	2 H D
· · · · · · · · · · · · · · · · · · ·			PN 40	2 HE
Nominal diameter acc. to EN			PN 63 PN 100	2 H F 2 H G
DN 50	104			2 11 0
PN 6 PN 10 PN 40	1 G A 1 G E		<b>DN 400</b> PN 6	2 J A
PN 63	1 G F		PN 10	2 J B
PN 100	1 G G		PN 16	2 J C
DN 65			PN 25	2 J D
PN 6	1 HA		PN 40	2 J E
PN 10 PN 40	1 HE		PN 63	2 J F
PN 63	1 H F		DN 500	
PN 100	1 H G		PN 6	2 K A
DN 80			PN 10	2 K B
PN 6	1 J A		PN 16	2 K C
PN 10 PN 40	1 J E		PN 25	2 KD
PN 63	1 J F		PN 40	2 K E
PN 100	1 J G		DN 600	
DN 100			PN 6	3 A A
PN 6	2 A A		PN 10 PN 16	3 A B 3 A C
PN 10 and PN 16 PN 25 and PN 40	2 A C 2 A E		PN 25	3 A D
PN 63	2 A F		DN 700	1.7
PN 100	2 A G		PN 6	3 B A
DN 125			PN 10	3 B B
PN 6	2 B A		PN 16	3 B C
PN 10 and PN 16	2 B C		PN 25	3 B D
PN 25 and PN 40	2 B E		DN 800	
PN 63	2 B F		PN 6	3 C A
PN 100	2 B G		PN 10	3 C B
DN 150			PN 16	3 C C
PN 6	2 C A		PN 25	3 C D
PN 10 and PN 16	2 C C		DN 900	1.1
PN 25 and PN 40 PN 63	2 C E 2 C F		PN 6	3 DA
PN 100	2 C G		PN 10 PN 16	3 D B 3 D C
			PN 25	3 D D
<b>DN 200</b> PN 6	2 E A		DN 1000	1-1
PN 10 and PN 16	2 E C		PN 6	3 E A
PN 25	2 E D		PN 10	3 E B
PN 40	2 E E		PN 16	3 E C
PN 63	2 E F		PN 25	3 E D
PN 100	2 E G		Nomin. diameter acc. to ASME	
DN 250			2 inch	
PN 6	2 F A		Class 150	5 G A
PN 10	2 F B		Class 300	5 G B
PN 16 PN 25	2 F C 2 F D		Class 600	5 G C
PN 40	2 F E		2½ inch	
PN 63	2 F F		Class 150	5 H A
PN 100	2 F G		Class 300	5 H B
DN 300			Class 600	5 H C
PN 6	2 G A		3 inch	
PN 10	2 G B		Class 150	5 J A
PN 16	2 G C		Class 300	5 J B 5 J C
PN 25	2 G D		Class 600	330
PN 40	2 G E		4 inch Class 150	6 A A
PN 63	2 G F		Class 300	6 A B
PN 100	2 G G		Class 600	6 A C

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with annular chamber

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No.	Orde	er code
Orifice plate with annular chambers	7 ME 1 1 1 0 -	1===	Orifice plate with annular chambers	7 ME 1 1 1 0 -	1	
5 inch Class 150 Class 300 Class 600 6 inch	6 B A 6 B B 6 B C		Tapping sockets with threaded connection G½; for liquids and gases PN 160, for steam PN 100  ■ Opposite one another,		A	
Class 150 Class 300 Class 600	6 C A 6 C B 6 C C	ш	straight  Opposite one another, bent- up, for vertical pipelines  Arranged on one side, for horizontal pipelines		B C	
8 inch Class 150 Class 300 Class 600	6 E A 6 E B 6 E C	Ш	With threaded connection ½-14 NPT male • Opposite one another,		Q	
10 inch Class 150 Class 300	6 F A 6 F B	Ш	straight  Opposite one another, bent- up, for vertical pipelines  Arranged on one side, for horizontal pipelines		R S	
Class 600 12 inch Class 150 Class 300 Class 600	6 F C 6 G A 6 G B 6 G C	Ш	With pipe Ø 12 mm for pipe union with ferrule, max. 200 °C permissible  • Opposite one another,		J	
14 inch Class 150 Class 300 Class 600	6 H A 6 H B 6 H C	Ш	straight  Opposite one another, bent- up, for vertical pipelines  Arranged on one side, for horizontal pipelines		K L	
16 inch Class 150 Class 300 Class 600	6 J A 6 J B 6 J C	Ш	With welding connection Ø 21.3 mm for liquids and gases PN 100 PN 400, for steam PN 100  ■ Opposite one another,		D	
20 inch Class 150 Class 300 Class 600	6 K A 6 K B 6 K C	Ш	<ul> <li>straight</li> <li>Opposite one another, bentup, for vertical pipelines</li> <li>Arranged on one side, for horizontal pipelines</li> </ul>		E F	
<b>24 inch</b> Class 150 Class 300 Class 600	7 A A 7 A B 7 A C	Ш	Shape of orifice disk aper- ture For flow in one direction (see figure "Shapes of orifice disk	_		
Special version Specify Order code and plain text Nominal diameter:, nominal pressure:, material no.: and material name:	9 A A 0 0	H1Y	<ul> <li>aperture")</li> <li>Orifice plate form A</li> <li>Quarter-circle nozzle form B</li> <li>For flow in both directions</li> <li>Cylindrical orifice plate form D</li> </ul>		A B D	
Material for non-corrosive media Support rings made of P265GH, material no. 1.0425; tapping sockets made of P235GH, material no. 1.0345; orifice disk made of material	12		Manufactured according to pressure equipment directive None <sup>1)</sup> According to Article 3, Paragraph 3 Design data Y31 to Y35 necessary		0	
no. 1.4404, permissible operating temperature -10 to +400 °C  Material for corrosive media			According to category 1, 2, 3 with CE marking and EC declaration of conformity Design data Y31 to Y35 necessary		5	
Support rings, tapping sockets and orifice disk made of X 2 CrNiMo 17- 12-2, material No. 1.4404; per- missible operating temp. -10 to +400 °C	15		Only possible outside Europe			

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with annular chamber

Selection and ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.:	Y21
e. g. no.: 110025240101,	
Attach calculation protocol to the order	
With third-party calculation Specify in plain text: No.:	Y22
Attach calculation protocol to the order	
Orifice plate without calculation	Y01
Specify in plain text: Diameter of orifice disk aperture <b>d = mm</b>	
Internal diameter of pipe <b>D= mm</b>	
Radius of quarter-circle nozzle <b>r = mm</b>	
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium:	Y31
e. g. natural gas	
Aggregate state Specify in plain text: Aggregate state:	Y32
Liquid or gaseous	
Fluid group	Y33
Specify in plain text: Fluid group:  Group 1: hazardous explosive fluid or	
Group 2: All other fluids	
Max. permissible pressure	Y34
Specify in plain text: PS = in bar or PSI	
Max. permissible temperature	Y35
Specify in plain text: TS = in °C or °F	
	_
Orifice plate degreased for oxygen measurements	
• DN 50 (2") DN 150 (6")	A12
• DN 200 (8") DN 400 (16")	A13
• DN 500 (20") DN 1000 (40")	A14
Material certificate Acceptance test certificate to EN 10204-3.1	C01
Cold water pressure test	D11
1.5 x PN, with acceptance test certificate EN 10204	
Orifice disk including gasket	on request
Sealing face of orifice plate with recess or	on request
groove	

### Note on ordering

The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an appendix or the statement "orifice plate without calculation" will be made with Order code Y01.

### Scope of delivery

Two support rings with tapping sockets, one orifice disk, one gasket between orifice disk and support ring. Graphite (99.85%) flat gasket with foil insert (1.4401, 0.1 mm). Application for liquids, steam, gases, liquid gases, acids, hydrocarbons, oils and oil products.

### Accessories

See "SITRANS P measuring instruments for pressure".

SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with single tapping

### Application



Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +570 °C.

### Design

One-piece orifice plate, orifice disk form A, B or D (see types of primary differential pressure devices in "Technical description", "Function"); see Ordering data for materials.

#### Overall length

40 mm to DIN 19205

#### Nominal diameters

EN: DN 50 to DN 500

ASME: 2 inch to 20 inch

### Nominal pressure

EN: PN 6 to PN 315

ASME: class 150 to 2500

### Sealing face to the mating flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for versions to ASME

### Tapping sockets

- With connection thread G½ DIN ISO 228/1, with connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to ASME
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection, Ø 21.3 mm

### Connection size

The connection size depends on the operating pressure, the temperature of the medium (DIN 19 207 and 19 211) and the medium, e. g.  $^{\circ}$ 

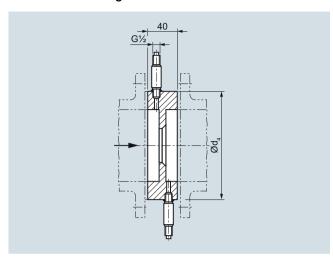
- For liquids and gases,
  - up to PN 160: Thread G% or welding connection Ø 21.3 mm
  - from PN 6 and PN 400: Welding connection Ø 21.3 mm
  - > PN 400: Welding connection Ø 24 mm
- · For steam
  - up to PN 100: Thread G1/2 or welding connection Ø 21.3 mm
  - > PN 100: Welding connection Ø 24 mm

See "Technical description" and "Function" for position of the tapping sockets.

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with single tapping

### Dimensional drawings



Tapping socket: Socket length is fixed in accordance with the pressure and nominal diameter (DIN 19 205, Part 2), dimensions in mm

- Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100,

Versions for steam lines: See "Technical description", "Function" for position of the tapping sockets.

### Nominal diameter acc. to EN

DN	Inside	External diameter d <sub>4</sub> / sealing face: plane, with recess or with groove.									Weight (approx. in kg)		
	diameter	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250	PN 315	With smallest nominal pressure	With largest nominal pressure
50	45 55	96	107	107	107	107	113	119	119	124	134	1.6	4.0
65	61 71	116	127	127	127	127	138	144	144	154	170	2.2	6.3
80	77 85	132	142	142	142	142	148	154	154	170	190	2.9	7.8
100	94 108	152	162	162	168	168	174	180	180	202	229	3.2	11.5
125	117 132	182	192	192	194	194	210	217	217	242	274	4.3	15.9
150	144 160	207	218	218	224	224	247	257	257	284	311	4.7	20.6
200	188 211	262	273	273	284	290	309	324	324	358	398	7.0	33.7
250	240 262	317	328	329	340	352	364	391	388	442	488	9.0	50.6
300	292 314	373	378	384	400	417	424	458	458	538	_	12.3	37.3
350	331 362	423	438	444	457	474	486	512	-	_	-	17.7	44.6
400	383 408	473	489	495	514	546	543	-	_	-	-	19.8	43.1
500	480 514	578	594	617	624	628	_	-	_	-	_	25.6	46.6

Orifice plates with single tappings for installation between EN flanges to EN 1092-1, dimensions in mm, weights

### Nominal diameter acc. to ASME

ASME	External diameter d4 / sealing face: plane, with recess or with groove.			Weight (approx. in kg)		
	Class 150	Class 300	Class 600	With smallest nominal pressure	With largest nominal pressure	
2 inch	105	111	111	1.6	4.0	
2½ inch	124	130	130	2.2	6.3	
3 inch	137	149	149	2.9	7.8	
4 inch	175	181	194	3.2	11.5	
5 inch	197	216	241	4.3	15.9	
6 inch	222	251	267	4.7	20.6	
8 inch	279	308	321	7.0	33.7	
10 inch	340	362	400	9.0	50.6	
12 inch	410	422	457	12.3	37.3	
14 inch	451	486	492	17.7	44.6	
16 inch	514	540	565	19.8	43.1	
20 inch	549	597	613	25.6	46.6	

Orifice plates with single tappings for installation between ASME flanges to ASME B 16.5, dimensions in mm and weights

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with single tapping

Selection and ordering data	Article No. Order code	Selection and ordering data	Article No. Order code
Orifice plate with single tap-	7 ME 1 1 2 0 1 1	Orifice plate with single tap-	7 ME 1 1 2 0 1 1
pings		pings	
for mounting between flanges		<b>DN 250</b> PN 6	2 F A
Sealing faces to the mating flanges: plane.		PN 10 and PN 16	2 F C
		PN 25	2 F D
the online configuration in		PN 40	2 F E
the PIA Life Cycle Portal.		PN 63	2 F F
Nominal diameter acc. to EN		PN 100 and PN 160	2 F H
DN 50		PN 250	2 F J
PN 6	1 G A	PN 315	2 F K
PN 10 PN 40	1 G E	DN 300	1.1
PN 63 PN 100 and PN 160	1 G F 1 G H	PN 6	2 G A
PN 250	1GJ	PN 10 PN 16	2 G B 2 G C
PN 315	1 G K	PN 25	2 G D
DN 65	100	PN 40	2 G E
PN 6	1 HA	PN 63	2 G F
PN 10 PN 40	1HE	PN 100 and PN 160	2 G H
PN 63	1 H F	DN 350	
PN 100 and PN 160	1 HH	PN 6	2 H A
PN 250	1 H J	PN 10	2 H B
PN 315	1 HK	PN 16	2 H C
DN 80		PN 25	2 HD
PN 6	1 J A	PN 40	2 HE
PN 10 PN 40	1 J E	PN 63 PN 100	2 H F 2 H G
PN 63	1 J F		2 ng
PN 100 and PN 160 PN 250	1 J H 1 J J	DN 400	2.12
PN 315	1 J K	PN 6 PN 10	2 J A 2 J B
	TOK	PN 16	2 J C
<b>DN 100</b> PN 6	2 A A	PN 25	2 J D
PN 10 and PN 16	2 A C	PN 40	2 J E
PN 25 and PN 40	2 A E	PN 63	2 J F
PN 63	2 A F	DN 500	
PN 100 and PN 160	2 A H	PN 6	2 K A
PN 250	2 A J	PN 10	2 K B
PN 315	2 A K	PN 16	2 K C
DN 125		PN 25	2 K D
PN 6	2 B A	PN 40	2 K E
PN 10 and PN 16	2 B C	Nominal diameter acc. to	
PN 25 and PN 40	2 B E	<u>ASME</u>	
PN 63 PN 100 and PN 160	2 B F 2 B H	2 inch	
PN 250	2 B J	Class 150	5 G A 5 G B
PN 315	2 B K	Class 300 Class 600	5 G C
DN 150			
PN 6	2 C A	<b>2½ inch</b> Class 150	5 HA
PN 10 and PN 16	2 C C	Class 300	5 HB
PN 25 and PN 40	2 C E	Class 600	5 HC
PN 63	2 C F	3 inch	
PN 100 and PN 160	2 C H	Class 150	5 J A
PN 250	2 C J	Class 300	5 J B
PN 315	2 C K	Class 600	5 J C
DN 200	7-1	4 inch	
PN 6	2 E A	Class 150	6 A A
PN 10 and PN 16 PN 25	2 E C 2 E D	Class 300	6 A B
PN 40	2 E B	Class 600	6 A C
PN 63	2 E F	5 inch	
PN 100 and PN 160	2 E H	Class 150	6 B A
PN 250	2 E J	Class 300	6 B B
PN 315	2 E K	Class 600	6 B C

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with single tapping

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No. Order code
Orifice plate with single tappings	7 ME 1 1 2 0 -	- 1 = = = = =	Orifice plate with single tappings	7 ME 1 1 2 0 1 1
6 inch			Tapping sockets	
Class 150	6 C A		with threaded connection G1/2;	
Class 300	6 C B		for liquids and gases PN 160,	
Class 600	6 C C		for steam PN 100	
8 inch			<ul> <li>Opposite one another, straight</li> </ul>	A
Class 150	6 E A		Opposite one another, bent-	В
Class 300	6 E B		up, for vertical pipelines	5
Class 600	6 E C		<ul> <li>Any arrangement of tapping</li> </ul>	G
10 inch			sockets (specify angle in	
Class 150	6 F A		plain text -Z Y02)	
Class 300	6 F B		With threaded connection	
Class 600	6 F C		½-14 NPT male	
	0.0		<ul> <li>Opposite one another,</li> </ul>	Q
<b>12 inch</b> Class 150	6 G A		straight	R
Class 300	6 G B		<ul> <li>Opposite one another, bent- up, for vertical pipelines</li> </ul>	n
Class 600	6 G C		Any arrangement of tapping	т
	000		sockets (specify angle in	
14 inch			plain text -Z Y02)	
Class 150	6 H A		With pipe Ø 12 mm for pipe	
Class 300 Class 600	6 H B		union with ferrule, max. 200 °C	
	6 H C		permissible	
16 inch			<ul> <li>Opposite one another, straight</li> </ul>	J
Class 150	6 J A		Opposite one another, bent-	К
Class 300	6 J B		up, for vertical pipelines	"
Class 600	6 J C		<ul> <li>Any arrangement of tapping</li> </ul>	M
20 inch			sockets (specify angle in	
Class 150	6 K A		plain text -Z Y02)	
Class 300	6 K B		With welding connection Ø	
Class 600	6 K C		21.3 mm; for liquids and gases PN 100 400,	
Special version			for steam PN 100 or	
Specify Order code and plain	9 A A 0 0	H 1 Y	Ø 24 mm; for liquids and	
text Nominal diameter:, nominal			gases over PN 400, for steam	
pressure:			over PN 100 • Opposite one another,	D
material no.: and			straight	, and the second
material name:			Opposite one another, bent-	E
Material for corrosive media			up, for vertical pipelines	
Orifice plate and tapping	2 3		<ul> <li>Any arrangement of tapping</li> </ul>	Н
socket made of X 2 CrNiMo 17-12-2, material no. 1.4404;			sockets (specify angle in	
permissible operating temp.			plain text -Z Y02)	
-10 to +400 °C			Shape of orifice disk aper-	
Material for non-corrosive	-		<b>ture</b> (see figure "Shapes of orifice	
media			disk aperture")	
Orifice plate and tapping	2 4		For flow in one direction	
socket made of 13 CrMo 4-5,			<ul> <li>Orifice plate form A</li> </ul>	A
material no. 1.7335; permissible operating temp.			<ul> <li>Quarter-circle nozzle form B</li> </ul>	В
-10 to +570, high temperature			For flow	
Orifice plate made of P265GH,	2 5		in both directions	D
material no. 1.0425; tapping	2 3		<ul> <li>Cylindrical orifice plate form</li> </ul>	<b>D</b>
sockets made of P235GHTC2,			Manufactured according to	-
material no. 1.0345; metering edge with X 15 CrNiMn 18-8,			pressure equipment directive	
material no. 1.4370,			None <sup>1)</sup>	0
deposition welded;			According to Article 3, Para-	1
permissible operating temper- ature			graph 3	'
-10 to +400 °C			Design data Y31 to Y35 neces-	
			sary	
			According to category 1, 2, 3	5
			with CE marking and EC dec- laration of conformity	
			Design data Y31 to Y35 neces-	
			sary.	

1) Only possible outside Europe.

### SITRANS F O delta p - Primary differential pressure devices

### Orifice plate with single tapping

Selection and ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: e. g. no.: 110025240101, Attach calculation protocol to the order	Y21
With third-party calculation Specify in plain text: No.: Attach calculation protocol to the order	Y22
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture d = mm Internal diameter of pipe D= mm Radius of quarter-circle nozzle r = mm	Y01
Angle between the tapping sockets Specify in plain text: Angle between the tapping sockets°	Y02
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: e. g. natural gas	Y31
Aggregate state Specify in plain text: Aggregate state: Liquid or gaseous	Y32
Fluid group Specify in plain text: Fluid group: Group 1: hazardous explosive fluid or Group 2: All other fluids	Y33
<b>Max. permissible pressure</b> Specify in plain text: PS = in bar or PSI	Y34
Max. permissible temperature Specify in plain text: TS = in °C or °F	Y35
Orifice plate degreased for oxygen measurements	_
• DN 50 (2") DN 150 (6")	A12
• DN 200 (8") DN 400 (16")	A13
• DN 500 (20") DN 1000 (40")	A14
Material certificate Acceptance test certificate to EN 10204-3.1	C01
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	D11
Overall length 65 mm (required for tapping sockets arranged on one side)	on request
Orifice disk including gasket	on request
Sealing face of orifice plate with recess or	on request

**Note on ordering**The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an appendix or the statement "orifice plate without calculation" will be made with Order code Y01.

### Scope of delivery:

One-part orifice plate with tapping sockets

**Accessories:** See "SITRANS P measuring instruments for pressure".

SITRANS F O delta p - Primary differential pressure devices

Metering pipe with orifice plate and annular chamber

### Application



Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +400 °C.

### Design

Orifice plate with annular chambers consisting of two support rings with replaceable orifice disk form A or B (see types of primary differential pressure devices in "Technical description", "Function"); flanged between inlet and outlet pipe sections with lengths according to DIN 19205.

#### Nominal diameters

• EN: DN 10 to DN 50 • ASME: 1/2 inch to 2 inch

### Nominal pressure

• EN: PN 10 to PN 100 ASME: class 150 to 600

### Sealing face of the end flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for versions to ASME

### Tapping sockets

(For the dimensions of the following tapping sockets, see page 3/422)

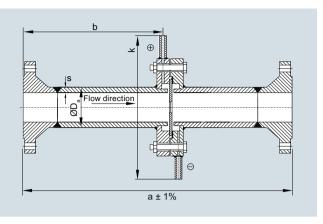
- With connection thread G½ DIN ISO 228/1, connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to **ASME**
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection, Ø 21.3 mm

For length of tapping sockets for all metering pipe L = 120 mmand position of tapping socket, see "Technical Description" and "Function".

SITRANS F O delta p - Primary differential pressure devices

### Metering pipe with orifice plate and annular chamber

### Dimensional drawings



### Nominal diameter acc. to EN

DN	PN	а	L	k	Pipe <sup>1)</sup> D <sub>a</sub> x s	Weight (approx. kg)
10	10 and 16 25 and 40 63 and 100	400	218	320 320 295	16 x 3	4.5 5 6.5
15	10 and 16 25 and 40 63 and 100	550	368	325 325 300	20 x 2.5	5 5.5 7.5
20	10 and 16 25 and 40	700	488	335	25 x 2.5	6.5 7
25	10 and 16 25 and 40 63 and 100	900	638	310	30 x 2.5	8 9 14
32	10 and 16 25 and 40	1100	788	320	38 x 3	11.5 12.5
40	10 and 16 25 and 40 63 and 100	1300	988	330 330 335	48.3 x 3.6 oder 50 x 5	13 15 25
50	10 and 16 25 and 40 63 100	1500	1188	340 340 345 345	60 x 5	20 22 34 34

Metering pipes with orifice plates and annular chambers for installation between EN flanges to EN 1092.1, dimensions in mm and weights

### Nominal diameter acc. to ASME

ASME	PN	а	L	k	Pipe <sup>1)</sup> D <sub>a</sub> x s	Weight (approx. kg)
½ inch	Class 150 Class 300 Class 600	550	368	297 307 307	20 x 2.5	5 5.5 7.5
¾ inch	Class 150 Class 300 Class 600	700	488	297 307 307	25 x 2.5	6.5 7 8
1 inch	Class 150 Class 300 Class 600	900	638	307 313 313	30 x 2.5	8 9 14
1¼ inch	Class 150 Class 300 Class 600	1100	788	316 322 322	38 x 3	11.5 12.5 14
1½ inch	Class 150 Class 300 Class 600	1300	988	326 335 335	48.3 x 3.6 or 50 x 5	13 15 25
2 inch	Class 150 Class 300 Class 600	1500	1188	345 371 351	60 x 5	20 22 34

Metering pipes with orifice plates and annular chambers for installation between ASME flanges to ASME B 16.5, dimensions in mm and weights

<sup>1)</sup> The stated pipe dimensions may vary, depending on availability. The pipe dimensions used can be found in the calculation for primary differential pressure devices and/or in the order confirmation.

<sup>1)</sup> The stated pipe dimensions may vary, depending on availability. The pipe dimensions used can be found in the calculation for primary differential pressure devices and/or in the order confirmation.

### SITRANS F O delta p - Primary differential pressure devices

### Metering pipe with orifice plate and annular chamber

	A C 1 N	0.1.1
Selection and ordering data	Article No.	Order code
Metering pipe for mounting between flanges	7 WE 13 10 -	
for non-corrosive media		
Orifice plate with annular		
chambers mounted between flanges		
Sealing faces to the mating flanges: plane		
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal diameter acc. to EN		
DN 10	1 4 0	
<ul><li>PN 10 and PN 16</li><li>PN 25 and PN 40</li></ul>	1 A C 1 A E	
• PN 63	1 A F	
• PN 100	1 A G	
DN 15		
• PN 10 and PN 16	1BC	
<ul><li>PN 25 and PN 40</li><li>PN 63</li></ul>	1 B E 1 B F	
• PN 100	1 B G	
DN 20		
• PN 10 and PN 16	1 C C	
<ul> <li>PN 25 and PN 40</li> </ul>	1 C E	
DN 25		
• PN 10 and PN 16	1 D C	
<ul><li>PN 25 and PN 40</li><li>PN 63</li></ul>	1 D E 1 D F	
• PN 100	1 D G	
DN 32		
• PN 10 and PN 16	1 E C	
• PN 25 and PN 40	1 E E	
DN 40		
<ul> <li>PN 10 and PN 16</li> <li>PN 25 and PN 40</li> </ul>	1 F C 1 F E	
• PN 25 and PN 40 • PN 63	1 F F	
• PN 100	1 F G	
DN 50		
• PN 10 and PN 16	1 G C	
• PN 25 and PN 40	1GE	
• PN 63 • PN 100	1 G F 1 G G	
Nominal diameter acc. to	-	
ASME		
½ inch		
<ul><li>Class 150</li><li>Class 300</li></ul>	5 B A 5 B B	
• Class 600	5 B C	
¾ inch		
• Class 150	5 C A	
• Class 300	5 C B	
• Class 600	5 C C	
1 inch	5.04	
• Class 150 • Class 300	5 D A 5 D B	
• Class 600	5 D C	
1¼ inch		
• Class 150	5 E A	
• Class 300	5 E B	
• Class 600	5 E C	

wetering pipe with on							-						
Selection and ordering data	Article No.	_			_	_		_	rde	_	_	ae	_
Metering pipe for mounting between flanges for non-corrosive media	7 ME 1 3 1 0 -					_	- 1	ľ	1			ï	
1½ inch		_	H								_		
• Class 150		5	F	Α									
• Class 300		5	F	В									
• Class 600		5	F	C									
2 inch													
• Class 150				Α									
• Class 300		_	_	В									
• Class 600		5	G	С									
Special version Specify Order code and plain		a		Α	n	n					н	1 Y	
text		٠	ſ	_	۰	Ŭ					•	•	
Nominal diameter:, nominal pressure:													
material no.: and													
material name:													
Material for non-corrosive media													
Orifice disk made of material					3	2							
no. 1.4404; support ring and													
flange made of material no. 1.0460, pipes and tapping													
sockets made of material num-													
ber 1.0345; permissible operating temper-													
ature													
-10 to +400 °C													
Material for corrosive media					_								
Orifice disk, support rings, pipes and flange made of					3	4							
material no. 1.4404;													
permissible operating temperature													
-10 to +400 °C													
Tapping sockets													
with threaded connection G½;													
for liquids and gases PN 160, for steam PN 100													
Opposite one another,								Α					
straight								В					
<ul> <li>Opposite one another, bent- up, for vertical pipelines</li> </ul>								ľ					
<ul> <li>Arranged on one side, for</li> </ul>								С					
horizontal pipelines													
With threaded connection 1/2-14 NPT male;													
for liquids and gases PN 160,													
<ul><li>for steam PN 100</li><li>Opposite one another, straight</li></ul>								Q					
Opposite one another, bent-								R					
up, for vertical pipelines													
<ul> <li>Arranged on one side, for horizontal pipelines</li> </ul>								S					
With pipe Ø 12 mm for pipe													
union with ferrule,													
max. 200 °C permissible								١.					
<ul> <li>Opposite one another, straight</li> </ul>								J					
Opposite one another, bent-								K					
up, for vertical pipelines								l.					
<ul> <li>Arranged on one side, for horizontal pipelines</li> </ul>								L					
With welding connection ∅													
21.3 mm for liquids and gases													
PN 100 PN 400, for steam PN 100													
Opposite one another, straight								D					
Opposite one another, bent- up, for vertical pipelines.								Ε					
<ul><li>up, for vertical pipelines</li><li>Arranged on one side, for</li></ul>								F					
horizontal pipelines								ľ					
								-		-			

### SITRANS F O delta p - Primary differential pressure devices

### Metering pipe with orifice plate and annular chamber

Selection and ordering data	Article No.	Orc	le	r code
Metering pipe for mounting between flanges for non-corrosive media	7 ME 1 3 1 0 1			П
Shape of orifice disk aperture				
For flow in one direction (see figure "Shapes of orifice disk aperture")  • Orifice plate form A		A		
Quarter-circle nozzle form B		В		
For flow in both directions				
<ul> <li>Cylindrical orifice plate form D</li> </ul>		D		
Manufactured according to				
pressure equipment directive None <sup>1)</sup>			0	
According to Article 3, Paragraph 3 Design data Y31 to Y35 necessary			1	
According to category 1, 2 with CE marking and EC dec- laration of conformity Design data Y31 to Y35 neces- sary			5	

<sup>1)</sup> Only possible outside Europe.

Selection and ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: e. g. no.: 110025240101, Attach calculation protocol to the order	Y21
With third-party calculation Specify in plain text: No.: Attach calculation protocol to the order	Y22
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture d = mm Internal diameter of pipe D= mm Radius of quarter-circle nozzle r = mm	Y01
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: e. g. natural gas	Y31
Aggregate state Specify in plain text: Aggregate state: Liquid or gaseous	Y32
Fluid group Specify in plain text: Fluid group: Group 1: hazardous explosive fluid or Group 2: All other fluids	Y33
Max. permissible pressure Specify in plain text: PS = in bar or PSI	Y34
Max. permissible temperature Specify in plain text: TS = in °C or °F	Y35
Orifice plate degreased for oxygen measurements	-
• DN 10 (½") DN 50 (2")	A12
Material certificate Acceptance test certificate to EN 10204-3.1	C02
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	D11

### Note on ordering

The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an attachment or the statement "orifice plate without calculation" will be made with Order code Y01.

### Scope of delivery:

Orifice plate, comprising two support rings with tapping sockets and one orifice disk, with gaskets between orifice disk and support ring, including screws and bolts.

Graphite (99.85%) flat gasket with foil insert (1.4401, 0.1 mm). Application for liquids, steam, gases, liquid gases, acids, hydrocarbons, oils and oil products.

### Accessories:

See "SITRANS P measuring instruments for pressure".

SITRANS F O delta p - Primary differential pressure devices

Calculation of primary devices

### Overview

Note on calculation order and product ordering:

Before an orifice plate is ordered, the calculation of the orifice pate must be completed with a calculation protocol.

The calculation protocol issued by the customer is then included in the order for the orifice plate as an attachment.

When ordering the "Primary differential pressure device calculation" service, a completed questionnaire must be enclosed.

This online questionnaire can be found in the PIA Life Cycle Portal at www.siemens.com/pia-portal.

All the data required for the calculation are requested menudriven and can be verified by a check function.

If the data entered in the questionnaire are incomplete, an extra charge will be made for the additional clarification and calculations required.

Selection and ordering data	Article No.
Calculation of orifice disk aperture an orifice plate, ISA-1932 nozzle, Venturi nozzle, Venturi tube and other primary differential pressure devices (without measuring sheet or sketch)	7ME1910-0A
Calculation of differential pres- sure or flow on an existing primary device	7ME1910-0D
Further designs Add "-Z" to Article No. and specify Order code(s) and plain text.	Order code
SITRANS F O - questionnaire online	Y02
The completed online question- naire should be attached to the order! (see Online Questionnaire in the PIA Life Cycle Portal)	

SITRANS F R

### Rotary-piston meters and automatic batchmeters - Introduction

### Overview

### Mechanical registers, automatic batchmeters and digital registers with current and pulse output



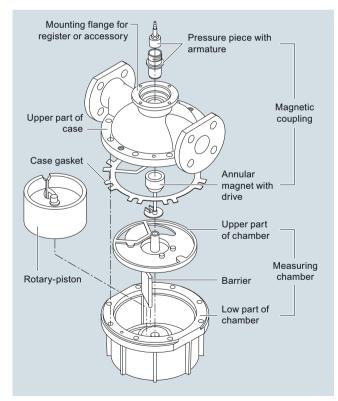
Rotary-piston meter DN 25 (1") with single-pointer dial type 01

Rotary piston meter with electric flow register in compact form

Rotary-piston meter DN 50 (2") with mech. single-pointer dial type 01, with accessories (here: cooling attachment and pulser)

Automatic batch meter DN 50 (2"), with rotary-piston meter, quantity preset register and shut-off valve

### Design



Metering mechanism of a rotary-piston meter DN 25/PN 10 (1"/MWP 145 psi) (industrial model)

The measuring chamber is inserted into the case for the rated pressure classes PN 25, PN 40 and PN 63 (MWP 363, 580 and 914 psi). The meters for rated pressures PN 4, PN 6 and PN 10 (MWP 58, 87 and 145 psi) have a measuring chamber machined to the lower part of the case.

All components of the meters are made of wear-resistant materials. Several materials are available for the parts which come into contact with the metered liquid (see Selection and Ordering data). The most suitable combination can be selected taking into account the corrosion resistance with respect to the liquid to be measured as well as the running characteristics and the permissible temperatures.

#### Benefits

- High measuring accuracy (approved for custody transfer)
- Suitable for flow rates up to 1000 l/min (264 USgpm)
- Wide flow rate range
- Low dependence on viscosity
- Low pressure drop
- Simple compact design
- · High reliability
- Advantages with extremely high viscosity since pressure drops up to 3 bar (43.5 psi) permissible
- Advantages with very low viscosity (e.g. liquefied gas) since only low pressure drops occur because of the light-weight mechanism with good running characteristics
- Wide range of available materials, e.g. plastic lining for particularly corrosive liquids
- Easy service as a result of simple design
- Liquid temperatures up to 300 °C
- Also available with external heater
- · Metering and dispensing without a power supply
- No inlet or outlet pipe sections required
- Independent of flow profile, conductivity and damping

Rotary-piston meters are characterized by:

- Accuracy
- Reliability
- Robust design

### Flow Measurement SITRANS F R

#### Rotary-piston meters and automatic batchmeters - Introduction

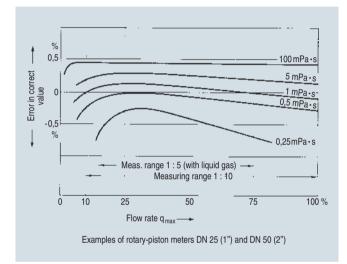
### Configuration

#### Error curves of rotary-piston meters

The shape of the error curve is also affected by the viscosity of the metered liquid. The error in measurement increases with decreasing viscosity, especially at the beginning and towards the end of the flow rate range.

By appropriate regulation, i.e. changing a pair of gear-wheels between the meter mechanism and the register, the position of the error curve can be displaced parallel to the zero line and thus the meter can be optimally calibrated. The appropriate pair of replacement gears can be read off from a table or determined with the aid of a calculating disk.

The illustration "Error curves of volumetric meters" shows error curves without any regulation having been carried out.



Error curves of volumetric meters dependent in shape and location on the flow rate and the viscosity of the liquid

# Note: 1 mPa·s = 1 cp Measuring accuracy

The rotary-piston meters are approved in the European Community and in many other countries for the custody transfer.

The following error limits apply between 0.2 % and 0.5 % of the correct value (depending on the liquid, the measuring range and the relevant calibration specifications).

The stated error limits in % of the correct value apply to the whole flow rate and for any delivery quantity greater than the smallest permissible quantity.

This is an important difference compared to other measuring instruments whose errors are related to the full-scale value and thus only reach the stated accuracy at one point - full-scale deflection. The minimum flow rate should not fall below 10% of the maximum flow rate in order to remain within the stated accuracy limit. This explains why the usual flow rate range for volumetric meters is 1:10.

**Note:** The measuring system of the rotary-piston meter must always be filled with the liquid to be measured in order to achieve a high measuring accuracy.

### Note

The material combinations which can be supplied are listed in the Selection and Ordering data.

The maximum permissible liquid temperature is determined by the "weakest link" in the particular combination (the PCTFE rotary-piston, for example, in a meter made of Cranium steel).

#### Service life (long-term accuracy)

The service life of a volumetric meter, i.e. the operating time until an overhaul or recalibration becomes necessary, is determined by the mechanical abrasion of the moving parts of the mechanisms which occurs because of forces from the metered liquid.

As well as the nature of the materials used (running characteristics), the service life is dependent on the lubricating properties of the metered liquid, the service is dependent on the lubricating properties of the metered liquid, the daily operating time and the cube of the flow rate (speed of rotation). The last factor is one of the reasons why only half of the maximum flow rate specified for the batch operation is permissible for continuous operation.

Since the above factors can hardly be determined exactly with industrial use of the meter, unequivocal statements on the service life (long-term accuracy) are not possible.

Recalibration is required every two years by law (in Germany) for meters used for custody transfer. On the basis of this regulation, it is recommended that meters which are not used for custody transfer be checked and recalibrated if necessary, at intervals of two to three years. Even this recommendation is based on average, "normal" operating conditions. A period of three years is too short, for example, for a meter used for the batch dispensing of lubricating oil, it will still work within the stated error limits even after five years or more.

Further technical specifications	
Materials and max. permissible liquid temperatures	
Housing (also lining with acid resistant meters) and measuring chamber	Temperature range
• Cast iron, spheroidal graphite, cast steel, Cranium steel	-30 +300 °C (-22 +572 °F)
General data	
Error limits	Between 0.2 % and 0.5 % of the correct value (depending on the metered fluid, the measuring range and the relevant calibration regulations) except for rotary-piston meters DN 15 (½") and acid-resistant meters with PCTFE pistons; where 1% of the actual value applies.
Reproducibility	Within 0.05 %
Adjustment	In steps from 0.01 %
Pressure drop	Max. permissible 3 bar (43.5 psi), max. 0.5 bar (7.25 psi) for acid resistant meters
Transmission from wet to dry space	Gland-free, via permanent magnet coupling
Installation position (axis of meter mechanism)	
Rotary-piston meter for industrial use	
- Automatic batchmeter	Vertical
Special designs	
- Rotary-piston meter for oil fuels	Any
- Rotary-piston meter for liquid gas	Meter axis vertical
Special inlet and outlet pipe sections	Not necessary
Pipe connection	Flanges drilled to DIN 2501, DIN 2547 (PN 63 only)
Filter size (mesh width)	0.8 mm (0.031 inch) for rotary- piston meter

SITRANS F R

### Rotary-piston meters and automatic batchmeters - Introduction

### Selection overview, rotary piston meters







Version		Rotary pis	ton meters	
Nominal diameter	DN 15	DN 25	DN 50	DN 80
Article No.	7MR10	7MR11	7MR14	7MR16
Nominal pressure				
PN 6			•	
PN 10		•		
PN 16		•	•	
PN 25	•	•	•	•
PN 40		•	•	•
PN 63		•	•	
Flow variables				
Max. 20 l/min	•			
Max. 100 l/min		•		
Max. 500 I/min			•	
Max. 1 000 I/min				•
Flange standards				
Drilled acc. to EN	•	•	•	•
Drilled acc. to ASME	•	•	•	•
With raised faces	•	•	•	•
Approvals				
Custody transfer		•	•	•
Material acceptance test EN 10204-3.1	•	•	•	•
ATEX		in prep	aration	
Piston material				
Carbon	•	•	•	•
Cast iron	•	•	•	•
Ni-resist		•	•	•
Hard rubber	•	•	•	•
PTFE 40 °C		•	•	•
PTFE 90 °C		•	•	•
CrNiMo steel with carbon contact surface		•		
CrNiMo steel with PTFE contact surface		•		
PCTFE	•	•	•	
Designs				
Mechanical singe-pointer dial	•	•	•	•
Mechanical double-pointer dial	•	•	•	•
As automatic batchmeter (incl. shut-off valve)		•	•	
With electronic flow register	•	•	•	•
Remote or compact installation	•	•	•	•

### Flow Measurement SITRANS F R

### Rotary-piston meters and automatic batchmeters - Introduction

### Rotary piston meters - Configurations

		N	lechanical displ	Digital o	displays	
			Compact desig	n	As separate model	Compact design
		Without pulse and current output	With pulse and	d current output	With pulse and current output Incl. protec- tive cover	With pulse and current output Incl. mount- ing bracket
Registers						
Single-pointer dial type 01  Double-pointer dial type 11 und 12  Quantity preset register		•	•	•		
SITRANS F RA110 electric						
flow registers (7MV1070)					•	
Without mounting bracket     With mounting bracket	© © ©				<del>`</del>	•
Pulser						
10 pulses/revolution 100 pulses/revolution					•	•
10 pulses/value per revolution	J.		•			
100 pulses/value per revolution						
Intermediate gear						
(Part of Article No. of the rotary piston meter)		•	•	•		
Pulser						
10 Impulse/measuring chamber volumes 100 Impulse/measuring chamber volumes (Selection with data posi-				•		
tion 14 of Article No. of the rotary piston meter)						
Cooling attachment						
Up to 80 °C: none (Article No. 7MR1) Up to 180 °C: one (Article No. 7MR1+ 7MV3001-1xx00) Upt to 260 °C: two		•	•	•	•	•
(Årticle No. 7MR1+ 7MV3001-2xx00)						
Rotary piston meters and automatic b	atchmeters					
Rotary piston meters DN 15 7MR10 DN 25 7MR11 DN 50 7MR14 DN 80 7MR16	60	•	•	•	•	•
Automatic batchmeters DN 25 7MR111 DN 50 7MR141	≤ PN 16			amber volumes: 0.033   (0.0087   0.179   (0.0473		

DN 15 (1/2") 0.033 | (0.0087 USgpm) DN 25 (1") 0.179 | (0.0473 USgpm) DN 50 (2") 1.5 | (0.317 USgpm) DN 80 (3") 4.32 | (1.14 USgpm)



### SITRANS F R

### Rotary-piston meters and automatic batchmeters - Introduction

### Technical specifications

Design	DN		PN		Rated	flow rate	Permissible	e flow ra	ate					
							With viscosity <sup>8)</sup>	Min. <sup>1)</sup> with continu- ous <sup>2)</sup> operation		Max. wit mittent <sup>3)</sup>	Max. with inter- nittent <sup>3)4)</sup> operation		with conti- s operation	
	mm	(inch)	bar	(psi)	I/min	(USgpm)	mPa·s (cp)	l/min	(USgpm)	l/min	(USgpm)	I/min	(USgpm)	
Rotaty-piston meter for	rindus	trial use	•											
	15 <sup>5)</sup>	(½) <sup>5)</sup>	25	(363)	20	(5.3)	≤ 1 < 5 800 2 000	1.5 1.0 0.2 0.2	(0.26) (0.2) (0.05) (0.03)	10 <sup>6)</sup> 20 20 10	(5.3) (5.3) (5.3) (1.3)	10 10 10 5	(2.6) (2.6) (2.6) (1.3)	
up to PN 16 (MWP 232 psi)	25	(1)	10 16 25 40 63	(145) (232) (363) (580) (914)	100	(26.4)	0.3 0.6 1 5 800	12 6 5 3 1	(3.2) (1.6) (1.3) (0.8) (0.26)	100 100 100 100 100	(26) (26) (26) (26) (26)	80 80 80 80 80	(13) (13) (13) (13) (13)	
	50	(2)	6 16 25 40 63	(87) (232) (363) (580) (914)	500	(132)	0.3 0.6 1 5 800	40 20 18 10 2	(11) (5.3) (4.8) (2.6) (0.53)	500 500 500 500 500	(106) (132) (132) (132) (106)	350 350 350 350 350	(44) (44) (44) (44) (44)	
up to PN 63 (MWP 914 psi)	80	(3)	25 40	(363) (580)	1 000	(264)	0.3 0.6 1 5 800	60 35 25 10 5	(16) (9.3) (6.6) (2.6) (1.3)	1 000 1 000 1 000 1 000 1 000	(211) (264) (264) (264) (211)	700 700 700 700 700 500	(93) (93) (93) (93) (93)	
Automatic batchmeter	(Rotary	/-piston	mete	r with qu	antity	preset reg	ister and m	echanic	cal shut-off v	alve)				
	25	(1)	10	(145)	100	(26.4)	0.3 0.6 1 5 800 <sup>7)</sup>	12 6 5 3 1	(3.2) (1.6) (1.3) (0.8) (0.26)	100 100 100 100 100	(26) (26) (26) (26) (26)	-	-	
	50	(2)	6 10	(87) (145)	500	132	0.3 0.6 1 5 800 <sup>7)</sup>	40 20 18 10 2	(11) (5.3) (4.8) (2.6) (0.53)	500 500 500 500 400	(106) (132) (132) (132) (106)	-	-	

<sup>1)</sup> For metal rotary-pistons: increase by a factor of 2, for PCTFE and PTFE/graphite filling rotary-pistons: increase by a factor of 3. 2) Continuous operation: over 8 hours a day.

In order to extend the service life of the pulse sensor, rotary-piston meters with current and/or pulse output (without intermediate gear) should only be operated at max. 60 % of the permissible flow.

### Piston materials

Piston material	Design	Permissible liquid temperature (°C/°F)	Max. perm. dyn. viscosity mPa⋅s (cp)	Article No. code
Carbon		-10 300/ 14 572	25	K
Cast iron (mat. No. GG 25) Cast iron (mat. No. GG 25)	with slotting	-10 300/ 14 572 -10 300/ 14 572		E B
Ni-Resist (mat. No. 0.6660) Ni-Resist (mat. No. 0.6660)	with slotting	-10 300/ 14 572 -10 300/ 14 572		N C
Hard rubber Hard rubber	with slotting	-10 40 <sup>1</sup> // 14 104 <sup>1</sup> / -10 40 <sup>1</sup> // 14 104 <sup>1</sup> /	50 50	G D
PTFE/graphite filling PTFE/ graphite filling PTFE/ graphite filling PTFE/ graphite filling	with slotting with slotting	0 40 <sup>2</sup> )/ 32 104 <sup>2</sup> ) 0 40 <sup>2</sup> )/ 32 104 <sup>2</sup> ) 0 90 <sup>2</sup> )/ 32 194 <sup>2</sup> ) 0 90 <sup>2</sup> )/ 32 194 <sup>2</sup> )	120 120 120 120	F L R M
PCTFE PCTFE	with slotting	-10 +40 <sup>2)</sup> / 14 104 <sup>2)</sup> -10 +40 <sup>2)</sup> / 14 104 <sup>2)</sup>	120 120	H J
CrNi steel with carbon contact surface (DN 25 (1") only) CrNi steel with PTFE contact surface (DN 25 (1") only)	Collar piston	-10 +200/ 14 392 -10 +40/ 14 104	> 10 > 10	S T

<sup>1)</sup> For 120 min max. 65 °C (149 °F); for 20 min max. 90 °C (194 °F), e. g. for cleaning procedures

<sup>3)</sup> For metal pistons: reduce by a factor ≈0.8 to extend service life.
4) Intermittent operation: up to 8 hours a day
5) Note: When using pistons made of carbon, there is danger of break in the case of liquid hammers

<sup>6)</sup> When using pistons made of carbon.
7) Max. permissible viscosity for exact closing of the shut-off valve and for exact dispensing: viscosities up to 4 000 mPa·s (cp) possible.

<sup>8)</sup> Higher viscosity on request.

<sup>2)</sup> Error limit max. 1%; at 90°C (194 °F) max. 2%

# Flow Measurement SITRANS F R

# Rotary-piston meters – Ordering data - DN 15 (½"), rated flow rate 20 l/min (5.3 USgpm)

	and Ordering da									Article No.		Order	. code
Rotary-pi	ston meter DN 1	5 (½")											
Nom. press.	Materials						Casing gasket	Can be heated using 2 thread connections	Weight appr. kg (lb)				
	Housing	Meas. chamber	Ro	tar	y pis	sto	n						
PN 25	Cast iron	Cast iron	•	•			Flat gasket	R <sup>3</sup> / <sub>4</sub> "	9.0 (19.8)	7MR1020-	E		
(363 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•	AFM 34	no	9.0 (19.8)	7MR1020-	S		
	n the Article No. f	or the online config						ortal.					
Rotary pis	ston material		$\downarrow$	$\downarrow$	. ↓	<b>\</b>	Max. permissib liquid temperat	le ure					
Carbon			•				300 °C (572 °F)				K		
Cast iron				•			300 °C (572 °F)				E		
Hard rubb	er				•		40 °C (104 °F)				G		
PCTFE						•	40 °C (104 °F)			_	Н		
	m shaft horizontal	From left to right From right to left Upwards Downwards								4 5 6 7 0			
Mechanic	al registers <sup>1)</sup>												
Single- po • Type 01	inter dial										0 1		
	ointer dial vertical mounting horizontal mounti										1 1 1 2		
Value per • 1   (0.26 Fastest p		drum								_		1	
Accessor	ies (pulsers, cod	oling attachments	1)										
<ul><li>None</li><li>Mounted</li></ul>	I											A B	
<ul> <li>Pulser al</li> </ul>	ready mounted <u>a</u>	bove the intermed	ate	ge	ear:								
- 10 puls - 100 pu	ses/value per revo llses/value per rev	olution volution										C D	
<ul> <li>Pulser al</li> </ul>	ready mounted <u>b</u>	elow the intermedi	ate	ge	ar:								
	ses/measuring ch llses/measuring c											G H	

<sup>1)</sup> For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00). For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

### **Flow Measurement**

SITRANS F R

# Rotary-piston meters - Ordering data - DN 25 (1"), rated flow rate 100 l/min (26.5 USgpm)

Selection and Orderin	•											Article No.		Orde	er code
Rotary-piston meter [	. ,														
Nom. press. Mate Hous		Meas. chamber	Rota	ary	pis	ton		,	,	Casing gasket	Weight appr. kg (lb)				
PN 10 (145 psi) Cast	iron	Cast iron			•	•	•	•	•	Flat gasket	10.5 (23.2)	7MR1110- E	-		
	Mo steel	CrNiMo steel	•	•	•	•	•		•	AFM 34		7MR1110- S	-		
PN 25 (363 psi) Cast	iron	Cast iron			•	•	•	•	•		20 (44.1)	7MR1120-E	-		
PN 40 (580 psi) Cast	steel	Cast iron			•	•	•	•	•	FKM (O-ring)	24 (52.9)	7MR1130-E	-		
PN 63 (914 psi) Cast	steel	Cast iron			•	•	•	•	•	Flat gasket AFM 34	30 (66.1)	7MR1140- E	-		
✓ Click on the Article	No. for the	online configurati	on ir	th	e P	IA L	_ife	Су	cle	Portal.					
			$\downarrow$												
Rotary piston materia	al									Max. permissible liquid temperature	Weight appr. kg (lb)				
Carbon									•		0.15 (0.33)	K			
Cast iron Cast iron, grooved								•			0.55 (1.21) 0.5 (1.1)	E			
Ni-resist Ni-resist, grooved							•				0.55 (1.21) 0.5 (1.1)	N			
Hard rubber Hard rubber, grooved						•				40 °C (104 °F) 40 °C (104 °F)	0.1 (0.2)	G			
PTFE with graphite fillir	ng				•	-				40 °C (104 °F)	0.3 (0.66)	F			
PTFE with graphite filling	ng, groove	d			•					40 °C (104 °F)	,	L			
PTFE with graphite filling PTFE with graphite fi		d			•					90 °C (194 °F) 90 °C (194 °F)		R			
CrNiMo steel with carb CrNiMo steel with PTFE				•							0.45 (0.99) 0.46 (1.01)	S			
PCTFE PCTFE, grooved			•								0.16 (0.35)	H			
Flow direction										1					
Mechanism shaft vertic	cal	From left to right From right to left From front to bac	ck									1 2 3			
Mechanism shaft horiz	ontal	From back to fro From left to right										4 5			
		From right to left Upwards Downwards										6 7 0			
Mechanical registers/	/quantity p	reset registers1)									Weight				
Single- pointer dial • Type 01											approx. kg (lb) 0.8 (1.76)		0 1		
Double-pointer dial															
<ul><li>Type 11, vertical mou</li><li>Type 12, horizontal m</li></ul>											1.5 (3.3) 2.5 (5.5)		1 1 1 2		
Quantity preset registe (only for vertical mechanisms)		t, flow direction ac	cord	ding	g to	со	des	: 1 .	4	)					
<ul><li>Type 30</li><li>Type 30, ex-protected</li></ul>	d switch										11 (24.3) 13.2 (29.1)		3 0 5 4		
Value per revolution  • 1   (0.26 USg)											11 (24.3)			1	
• 10 l (2.65 USg)	"										13.2 (29.1)			2	
Accessories (pulsers)  None  Mounted	s, cooling a	ittacnments)**												A B	
Pulser already mount	ted ahove	the intermediate o	ıear.												
- 10 pulses/value per	r revolution	1	joai.											C	
Pulser already mount			ear.												
- 10 pulses/measurin	ng chambe	r volume	Jui.											G	
- 100 pulses/measuri	ing chamb	er volume												Н	

For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00). For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

# Flow Measurement SITRANS F R

# Rotary-piston meters – Ordering data - DN 50 (2"), rated flow rate 500 l/min (132 USgpm)

Selection and C	Ordering data										Article No.		Orde	r code
Rotary piston n	neter DN 50 (2")													
Nom. press.	<b>Materials</b> Housing	Meas. chamber	Rot	tary	pis	ton			Casing gasket	Weight appr. kg (lb)				
PN 6 (87 psi)	Cast iron	Cast iron		•	•	•	•	•	Flat gasket AFM 34	31 (68.3)	7MR1410-	E	-	
PN 16 (232 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•		•			7MR1410-	S		
PN 25 (363 psi)	Spher. cast iron	Cast iron		•	•	•	•	•		45 (99.2)	7MR1420-	E		
PN 40 (580 psi)	Cast steel	Cast iron		•	•	•	•	•	FKM (O-ring)	60 (132)	7MR1430-	E		
PN 63 (914 psi)	Cast steel	Cast iron		•	•	•	•	•	Flat gasket AFM 34	94 (207)	7MR1440-	E		
	Article No. for the	online configurat	ion i	in th	ne F	PIA	Life	Cy	cle Portal.					
			$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$						
Rotary piston n	naterial								Max. permissible liquid temperature	Weight appr. kg (lb)				
Carbon								•		0.9 (2.0)		K		
Cast iron							•			3.5 (7.7)		E		
Cast iron, groove	ed						•			3.4 (7.5)		В		
Ni-resist						•				3.5 (7.7)		N		
Ni-resist, groove	ed					•			12.20 (12.1.25)	3.4 (7.5)		С		
Hard rubber Hard rubber, gro					•				40 °C (104 °F) 40 °C (104 °F)	0.7 (1.5)		G D		Ш
PTFE with graph		-1		•					40 °C (104 °F)	0.5 (1.1)		F		
PTFE with graph	nite filling, groove nite filling	d		:					40 °C (104 °F) 90 °C (194 °F)			L R		
	nite filling, groove	ed		•					90 °C (194 °F)			M		
Flow direction			ı		1	ı	1	ı			-			
Mechanism shat	ft vertical	From left to right												
		From right to left From front to back									3			
		From back to fro									4			
Mechanism shat	ft horizontal	From left to right									5			
		From right to left									6			
		Upwards Downwards									7			
Mechanical red	istors/auantity r	preset registers <sup>1)</sup>								Weight appr.	_			
Single- pointer of		oreset registers								kg (lb)				
• Type 01	nai									0.8 (1.76)		0 1		
Double-pointer of	dial									1.5 (3.3)		1 1		
• Type 11, vertice														
• Type 12, horizo	Ü									2.5 (5.5)		1 2		
Quantity preset (		ft, flow direction a	ccoi	rdir	na ta	0 00	ode:	s 1	4)					
• Type 30		.,		-	.9				,	11 (24.3)		3 0		
• Type 30, ex-pr	otected switch									13.2 (29.1)		5 4		
Value per revolu														
<ul> <li>10   (2.65 USg)</li> <li>100   (26.5 USg)</li> </ul>	,												2	
	ulsers, cooling a	attachments) <sup>1)</sup>									-			
• None	ulcolo, ccomig (	accaominonto,											A	
<ul> <li>Mounted</li> </ul>													В	
<ul> <li>Pulser already</li> </ul>	mounted above	the intermediate	gear	r:										
	lue per revolutior alue per revolutio												C D	Ш
•	•	the intermediate g	ear	:										
- 10 pulses/me	easuring chambeneasuring chamb	er volume	,										G H	
- 100 puises/m	ieasuring chamb	ei voiuiTie											П	

For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00). For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

### **Flow Measurement**

SITRANS F R

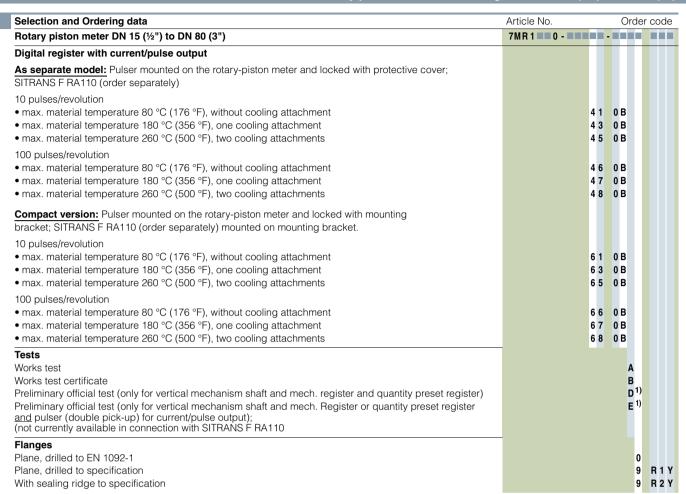
# Rotary-piston meters – Ordering data - DN 80 (3"), rated flow rate 1000 l/min (264 USgpm)

Selection and C									Article No.			Ord	er code
	neter DN 80 (3")						0	\\/-:					
Nom. press.	Materials						Casing gasket	Weight appr. kg (lb)					
	Housing	Meas. chamber		ı		_							
PN 25 (363 psi)		Cast iron	•	•	•	•		108 (238)	7MR1620				
PN 40 (580 psi)		Cast iron	•	•	•	•	1 (	150 (331)	7MR1630	- = E	-		
/ Click on the A	Article No. for the or	lline configuration in th	ne Pi	A L	.ite ↓		ycie Portai. I.						
Rotary piston n	naterial		•	*	*	•	Max. permissible liquid temperature	Weight appr. kg (lb)					
Carbon						•	•	2 (4.4)			K		
Cast iron Cast iron, groove	ed				•			9.5 (21) 9.4 (20.7)			E B		
Ni-resist Ni-resist, groove	ed			•				10 (22) 9.6 (21.2)			N C		
Hard rubber Hard rubber, gro	poved		•				40 °C (104 °F) 40 °C (104 °F)	2 (4.4) 1.8 (4)			G D		
Flow direction Mechanism shaf	ft vertical	From left to right From right to left From front to back								1 2 3			
		From back to front								4			
Mechanism shat	ft horizontal	From left to right From right to left Upwards Downwards								5 6 7 0			
Mechanical reg	isters/quantity pre	set registers <sup>1)</sup>						Weight appr. kg (lb)	_				
Single- pointer of Type 01	dial							0.8 (1.76)			0 1		
<ul><li>Type 11, vertice</li><li>Type 12, horize</li></ul>	al mounting							1.5 (3.3) 2.5 (5.5)			1 1 1 2		
Quantity preset (only for vertical • Type 30 • Type 30, ex-pr	mechanism shaft, f	low direction accordin	g to	CO	des	3 1	4)	11 (24.3) 13.2 (29.1)			3 0 5 4		
Value per revolution 100 l (26.5 US) • 1000 l (265 US)	<b>ution</b> g)								_			3 4	
Accessories (p	ulsers, cooling atta	nchments) <sup>1)</sup>											
<ul><li>None</li><li>Mounted</li></ul>												A B	
<ul> <li>Pulser already</li> </ul>	mounted above the	intermediate gear:											
•	lue per revolution alue per revolution											C D	
-	mounted below the	-											
	easuring chamber v neasuring chamber											G H	

For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00). For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

### Flow Measurement SITRANS F R

# Rotary piston meters – Ordering data - DN 15 (½") to DN 80 (3")



<sup>1)</sup> Not with PTFE and PCTFE pistons.

Further designs	Order code
Article No. of the rotary-piston meter 7MR1 - Z	
Material acceptance test to EN 10 204-3.1	E01

#### Certificates and approvals

Classification according to pressure equipment directive (DGRL 97/23/EG):

- 7MR1020: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1110, 7MR1020, 7MR1130 and 7MR1140: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1410 and 7MR1420: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1430 and 7MR1440: for liquids of group 2; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP);
  - For liquids of fluid group 1 on request.
- 7MR1620 and 7MR1630: for liquids of fluid group 2; complies with requirements of article 3, para. 3 (SEP)

### **Flow Measurement**

SITRANS F R

# Rotary-piston meters - Ordering data - Automatic batchmeter DN 25 (1") and DN 50 (2")

Selection and C												Article No.		Ord	er co	de
Automatic batcl	•	•														
		ownstream of met	erın	ig m	neci	nar	nsm	1			\A( '					
Nominal pressure	<b>Materials</b> Housing	Meas. chamber	Ro	tary	pis /	tor	1				Weight appr. kg (lb)					
PN 10 (145 psi)	Cast iron	Cast iron	•			•	•	•	•		38 (83.8)	7MR111 = -	E			ī
	CrNiMo steel	CrNiMo steel	•	•	•	•	•		•			7MR111 = -	-S		•	
			$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	. ↓							
Automatic batcl With mechanical		<b>!")</b> <b>ownstream</b> of met	erin	ıg m	necl	nar	nism	1								
Nominal pressure	<b>Materials</b> Housing	Meas. chamber	Ro	tary	, pis	tor	<b>1</b>				Weight appr. kg (lb)					Ī
PN 6 (87 psi) <sup>1)</sup>	Cast iron	Cast iron			•	•	•	•			58.5 (129)	7MR141 = -	E			ī
PN 10 (145 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•		•				7MR141 = -	S			
Rotary piston m	naterial		1	1	1	.1				Max. permissible liquid temperature	e kg (lb)					
Carbon									•		0.15 (0.3)		K			
Cast iron Cast iron, groove	ed							•			0.55 (1.2) 0.5 (1.1)		E B			
Ni-resist							•				0.55 (1.2)		N			
Ni-resist, groove	d						•				0.5 (1.1)		С			
Hard rubber Hard rubber, gro	oved					•				40 °C (104 °F) 40 °C (104 °F)	0.1 (0.2)		G D			
PTFE with graph PTFE with graph PTFE with graph	ite filling, groove	d			•					40 °C (104 °F) 40 °C (104 °F) 90 °C (194 °F)	0.3 (0.7)		F L R			
PTFE with graph	ite filling, groove	d			•					90 °C (194 °F)			M			
PCTFE (only DN PCTFE, grooved				•						40 °C (104 °F) 40 °C (104 °F)	0.16 (0.4)		H			
CrNiMo with carl CrNiMo with PTF			•								0.4 (0.9)		S			
Tappet bushing  • With maintenar  • With bellows <sup>2)3</sup>	nce-free sealed b	oushing		ı		Ш		U.				2 3	П			
Flow direction Mechanism shaf	t always vertical	<ul><li>From left to right</li><li>From right to left</li></ul>											1 2			
Quantity preset Type 30 Type 30, ex-pro		<u> </u>										_	3 (			
Value per revolu 1 I/0.1 : 0.1 I (onl 10 I/1 : 1 I 100 I/10 : 1 I (onl	y DN 25)	tment step												1 2 3		
Accessories	y DIN 00)															
Without Mounted														A B		
Tests																
Works test Works test certifi	cate													A B		
Preliminary offici														C		
Flanges Plane, drilled to I Plane, drilled to I With sealing ridge	specification	n													0 9 R 1 9 R 2	

Note: If pressure impacts are likely, the valve should be before the automatic batchmeter in the direction of flow.

- Flange connections drilled to PN 10/16 (MWP 145/232 psi)
   Restricted operating conditions (max. 40 °C (104 °F), max. 3 bar (43.5 psi))
   Separate Article No. required (see Selection and Ordering data table "Accessories")

### Certificates and approvals

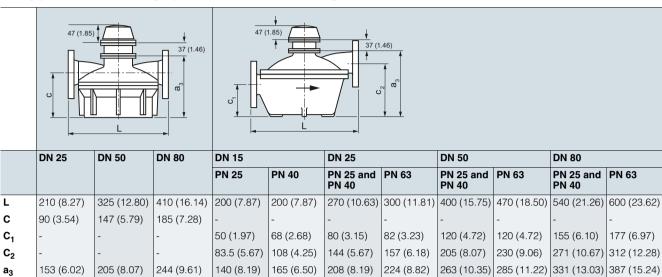
Classification according to pressure equipment directive (DGRL 97/23/EG): For liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)

### Flow Measurement SITRANS F R

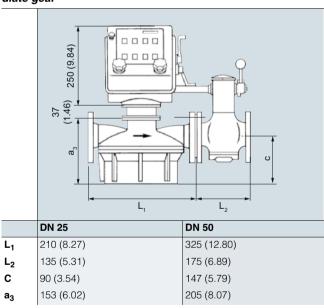
### Rotary-piston meters and Automatic batchmeter - Dimensional drawings

# Dimensional drawings

### Rotary-piston meter with single pointer dial and intermediate gear



# Automatic batchmeter with quantity preset register intermediate gear



n addition to dimension $a_3$ the following dimensions need to be added for extra add-on components (dimensions in mm (inch))							
Addition of	a <sub>3</sub> +						
Intermediate gear	37 (1.46)						
Single-pointer dial type 01	47 (1.85)						
Double-pointer dial type 11	58 (2.28)						
Double-pointer dial type Typ 12	250 (9.84)						
Pulser	82 (3.23)						
Mounting bracket and electronic flow register	200 (7.87)						
1 additional insulation attachment (up to 180°C (176°F))	159 (6.26)						
2 additional insulation attachments	318 (12.52)						
Quantity preset register	287 (11.30)						

#### **Flow Measurement**

SITRANS F R

#### SITRANS F RA110 electric flow register

#### Overview



#### Application

The display of the electric flow register is a universal LCD for converting the measured value and displaying the current value, total value and accumulated total. Depending on the design, the flow register can be provided with a scaleable pulse output for the total value and/or a current output of 0/4 to 20 mA.

#### Design

The electric flow register is fitted with a large, extremely clear LCD  $(90 \times 40 \text{ mm} \text{ in size})$ , where the flow and total value are displayed with seven 17 mm digits and 8 mm digits respectively. Units, time units, flow trend and device status are displayed in addition.

The electronics is fitted in a rugged aluminum housing (IP67) with three large keys. The alphanumeric menu structure in English or German permits simple configuring and can be used for many applications.

Models 61, 63, 65 and 66, 67, 68 are supplied with the electric flow register already mounted on the pulser.

### Function

The flow register of the SITRANS F RA110 receives, e.g. from a pulser, information on the current flow. This information is converted into the flow per second, minute, hour or day using a programmable 7-digit K-factor. Conversion is also carried out for the total values and accumulated totals. The units for the flow and accumulated total are completely independent.

The total value can be reset by pressing the "CLEAR" key twice. The accumulated total cannot be reset and is displayed with 11 digits.

The standard configuration displays the total value (17 mm digits) and the flow (8 mm digits) simultaneously. It is also possible to output the current value on the 17 mm digits. In this case, the total value is displayed by pressing "SELECT". The electric register has inputs for Namur sensors. Connection is possible to practically every available sensor system.

The active and passive 0/4 to 20 mA analog output has a resolution of 12 bits and can be connected to a load of 750  $\Omega$ .

The pulse output can be exactly defined, e.g. to generate one pulse per 3.5 liters. The pulse lengths can be set to 1 to 9 999 ms. The maximum output frequency is limited to 500 Hz. The transistor can switch max. 50 V DC/ 300 mA.

All configuration parameters are saved in an EEPROM. The total value and the accumulated total are saved once a minute, so that only a minimum amount of information is lost in the event of a power failure.

The SITRANS F RA110 can be ordered with powerful LED background lighting for use under unfavorable viewing conditions. The menu language of the displays can be set to German or English.

### Technical specifications

rechnical specification	ons
Input	
Pulse input	NAMUR signal
Frequency	NAMUR: 0 500 Hz
Sensor supply	8.2 V or 24 V DC
Output	
Pulse output	Max. frequency 500 Hz, pulse width 1 9999 ms adjustable.  Type: Transistor output, max. load 24 V DC/170 mA (active) and 50 V DC/300 mA (passive)
Analog output	Range 0/4 20 mA, accuracy: $<\pm$ 0.1 %, resolution 12 bit, response time (10 90 %): 100 ms, load max. 750 $\Omega$ , active or passive, function: flow 0/4 20 mA freely adjustable
Functionality	
Operator	The total value and flow are displayed.  The total value is deleted by double-pressing the "CLEAR" key.
	The total value and the accumu-

ing the "SELECT" key.

Total value

17 mm (0.67 inch) high, 7 digits, max. 3 decimal places; the total value can not be deleted.

Units: I, m<sup>3</sup>, gal, USg, kg, lb, bbl or none

lated total are displayed by press-

K-factor: 7-digit 0.000010 to 9 999 999 Settings independent of flow

Accumulated total 8 mm high (0.31 inch), max. 11 digits, max. 3 decimal

max. 11 digits, max. 3 decimal places, the accumulated total cannot be

reset

8 mm (0.31 inch) or 17 mm (0.65 inch) high, max. 7 digits, max. 3 decimal places

Units: ml, l, m<sup>3</sup>, mg, g, kg, ton, Nl, Nm<sup>3</sup>, scf, ref, cf, lb, bbl, gal or none Time units: second, minute, hour, day.

#### Rated conditions

Operating temperature -40 ... +80 °C (-40 ... +176 °F)
Degree of protection IP67 (NEMA 4)

#### Design

Flow rate

Material Housing: aluminum, UV-resistant powder coating Window: Polycarbonate

Gasket material: Silicone
Dimensions See dimensional drawings

### Power supply

Power supply with 24 V AC/DC  $\pm$  10 % or 115/230 V AC  $\pm$  10 %

Power consumption Max. 9 W

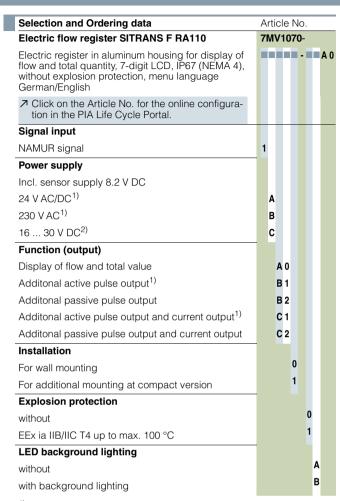
### Certificate and approvals

Ex protection
For official calibration inspections

EEx ia IIB/IIC T4
In preparation

### Flow Measurement SITRANS F R

### SITRANS F RA110 electric flow register

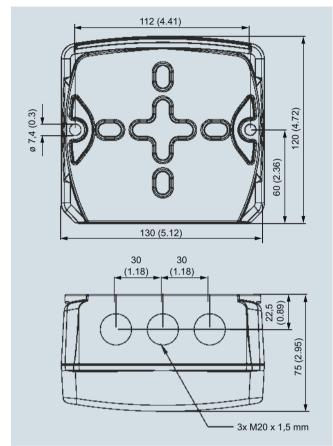


### 1) Not for ATEX version

#### Note:

Cable glands for M20 are not included in delivery.

# Dimensional drawings



Electric flow register SITRANS F RA110, dimensions in mm (inch)

<sup>2)</sup> For ATEX version only

#### **Flow Measurement**

SITRANS F R

#### Pulser with inductive pick-up

#### Overview



Pulser with inductive pick-up

The pulser is used for quantity metering in conjunction with electromechanical pulse counters as a transmitter with output signals for electronic data processing.

Using the pulser, quantity measurements from volumetric meters can be converted into electrical pulses for remote transmission.

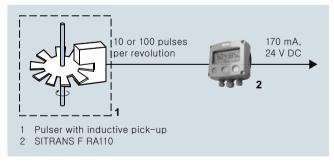
### Design

- · Electronic design
- High pulse frequency (≤ 3 000 Hz)
- Electronic output
  - 170 mA, 24 V DC (delivering current) for electromechanical pulse counters
  - 2 mA, 24 V DC (absorbing current) for electronic processing

#### Function

#### Pulse valence with quantity measurements

Conversion of metered quantities into electrical pulses



Measuring system for remote metering and digital data processing

The metering shaft of the volumetric meter drives a pulse disk. The vanes of the pulse disk successively enter the air gap of an inductive pick-up, thus changing the coupling between two coils. This causes a change in resistance that is converted into a pulse by the subsequent pulse amplifier, which also powers the pick-up.

The pulser operates without contacts. No measurable force is exerted on the disk. Hence the system is free from feed-backs.

Depending on the design, 10 or 100 pulses are produced for each revolution of the drive. The pulse amplifier amplifies the incoming pulses. A timing circuit prevents a continuous output pulse.

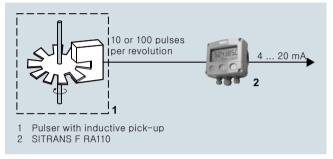
The quantitative value associated with one pulse depends on the value per revolution of the drive (pulses per liter or gallon) or on the respective volume of the measuring chamber of the drive.

The selection of the pulser – whether 10 or 100 pulses per drive revolution – is to be made according to the desired resolution.

Pulsers with two inductive pick-ups are available for systems for <u>custody transfer</u> since at present the PTB regulations specify a <u>duplicated transmission</u> system with pulse comparison.

#### Pulse valence with flow rate measurements

Conversion of metered quantities into electrical pulses



Measuring system for flow-rate measurement

During flow measurements, the change in resistance is converted to pulses by SITRANS F RA110. Each pulse corresponds to a given quantity of metered liquid. The number of pulses per unit in time (the frequency) is a measure of the flow rate.

SITRANS F RA110 converts the incoming NAMUR signals into load-independent direct current.

The electric pulser is available for 10 or 100 pulses per revolution. The choice depends on the smallest flow rate still to be indicated.

### Flow Measurement SITRANS F R

#### Pulser with inductive pick-up

### Technical specifications

Slot initiator

Power supply (from pulse amplifier)

8 V DC,  $R_i$  approx. 1  $k\Omega$  (DIN 19234)  $C_i$  = 40 nF;  $L_i$  = 160  $\mu$ H

Sensor SJ 3,5 -N-K37

 $\leq$  50  $\Omega$  (DIN 19234)

180°: 180° ± 30°

Electrically offset 90° ± 30°

10 or 100

1:1±17%

3000 Hz

Change in current consumption on  $\leq 1 \text{ mA}/\leq 3 \text{ mA}$  (DIN 19234)

pulse

Permissible line impedance between pick-up and amplifier

Number of pulses per revolution of the drive

Phase position of the channels of the double pick-up

Duty factor

Max. pulse frequency

Pulse valence

Permissible ambient temperature

Degree of protection

-25 ... +100 °C (-13 ... +212 °F)

IP43 to EN 60529 with register P65 to EN 60529 with protective

Dependent on value per revolution of the drive of the respective

cover

Any

meter

This pulser has the EC-Type Examination Certificate PTB 99

ATEX 2219X.

1.2 kg (2.65 lb)

Mounting position

Weight approx. Ex approval

IIG EEx ia IIC T6

Article No.

7MV1105-1AA00 7MV1105-2AA00

7MV1105-3AA01

7MV1105-4AA01

C73000-B5174-C25

# Selection and Ordering data Pulser with inductive pick-up

Weight approx. 1.2 kg (2.65 lb)

Single pick-up

10 pulses/revolution

• 100 pulses/revolution

Double pick-up<sup>1)</sup>

(for custody transfer installations)

• 10 pulses/revolution

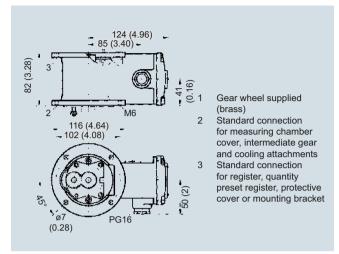
• 100 pulses/revolution

Instruction Manual

German/English

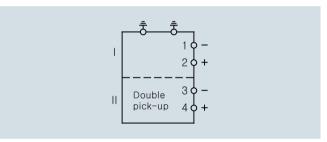
1) Pulse channels electrically offset by 90°

### Dimensional drawings



Pulser with inductive pick-up, dimensions in mm (inch)

# Schematics



Pulser with inductive pick-up, connection diagram for clockwise rotation; pick-up I to terminals 3 and 4 for counter-clockwise rotation

# Flow Measurement

SITRANS F R

Notes

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#### **Level Measurement**



-,-	• 10.11011
	Point level measurement
4/9	RF Capacitance switches
4/12	- Pointek CLS100
4/18	<ul><li>Pointek CLS200 – Standard</li></ul>
4/27	– Pointek CLS200 – Digital
4/36	<ul> <li>Pointek CLS200 – Standard and Digital</li> </ul>
4/44	<ul><li>Pointek CLS300 – Standard</li></ul>
4/51	– Pointek CLS300 – Digital
4/57	<ul> <li>Pointek CLS300 – Standard and Digital</li> </ul>
4/64	- Pointek CLS500
4/80	<ul> <li>Pointek CLS Specials</li> </ul>
	Vibrating switches
4/82	- SITRANS LVL100
4/88	– SITRANS LVL200
4/104	- SITRANS LVS100
4/107	– SITRANS LVS200
	Rotation paddle switches
4/116	– SITRANS LPS200
	Ultrasonic non-contacting switch
4/127	- Pointek ULS200
	Continuous level measurement
4/132	Ultrasonic
	Ultrasonic transmitters
4/136	– SITRANS Probe LU
4/141	– The Probe
	Ultrasonic controllers
4/144	– SITRANS LUT400 series
4/152	– MultiRanger 100/200
4/156	- HydroRanger 200
4/160	- SITRANS LU01 and LU02
4/164	– SITRANS LU10
4/168	– SITRANS LU AO
	Ultrasonic transducers
4/171	– ST-H
4/174	- EchoMax XRS-5
4/178	- EchoMax XPS

Overview

# **Continuous level measurement** (continued)

Accessories for ultrasonic

- EA aiming devices

- FMS mounting brackets

89 - TS-3 temperature sensor

Radar transmitters

94 - SITRANS Probe LR

98 - SITRANS LR200

- SITRANS LR200 Antennas

- SITRANS LR200 Specials

- SITRANS LR250 Horn Antenna

- SITRANS LR250 Specials

- SITRANS LR250 threaded PVDF antenna

- SITRANS LR250 threaded PVDF Specials

- SITRANS LR250 Flanged **Encapsulated Antenna** 

42 - SITRANS LR250 Flanged **Encapsulated Specials** 

43 – SITRANS LR250 Hygienic

**Encapsulated Antenna** 

- SITRANS LR250 Hygienic **Encapsulated Specials** 

- SITRANS LR260

- SITRANS LR460

- SITRANS LR260/LR460 Specials

- SITRANS LR560

- SITRANS LR560 Specials

86 Guided wave radar transmitters

- SITRANS LG series

Capacitance transmitters

- SITRANS LC300

- SITRANS LC500

- SITRANS LC300 and LC500 Specials

#### Communication

SmartLinx module

Dolphin Plus Software

You can download all instructions, catalogs and certificates for SITRANS L free of charge: www.siemens.com/level

Siemens FI 01 · June 2015

Product Overview

# Overview

	Application	Device description	Page	Programming Software
Point level measurement - RF Cap	acitance switches			
1		Pointek CLS100/CLS200/CLS300/CLS500		
#777	suitable for a variety of industries	CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam	4/12	SIMATIC PDM
		CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features	4/18	SIMATIC PDM
		CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features	4/44	SIMATIC PDM
		CLS500: inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure; HART communication for remote commissioning	4/64	SIMATIC PDM
Point level measurement - Vibratin	ng switches			
	Reliable vibrating point level	SITRANS LVL100/LVL200		
	switches for liquid and slurry applications across all industries	<ul> <li>LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand level applications. Also ideal for dry run protec- tion</li> </ul>	4/82	-
		<ul> <li>LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection; can also be used for Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511</li> </ul>	4/88	-
	Reliable vibrating point level	SITRANS LVS100/LVS200		
TT	switches for bulk solids in a wide variety of applications at a competitive price	Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications		
77 1		• LVS100	4/104	-
[ ]		• LVS200	4/107	-
Point level measurement - Rotatin	<u> </u>			
	Reliable rotating point level switches for bulk solids in a wide variety of applications at a com- petitive price	Rotating paddle switch for detection of high, low, and demand levels for a wide variety of bulk solids industries. Unique engineering provides long-lasting reliable performance	,,	-

	Application	Device description	Page	Programming Software
Point level measurement - Ultraso	nic switch			
	Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries	Pointek ULS200  Rugged design, no moving parts, and virtually maintenance-free  Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals	4/127	-
Continuous measurement - Ultras	onic transmitters			
	2-wire loop powered ultrasonic transmitter for level, volume, and flow monitoring of liquids in open channels, storage vessels and simple process vessels	Continuous level measurement up to 12 m (40 ft) range     Sonic Intelligence signal processing     Auto False-Echo Suppression	4/136	-
nin 6	Compact level transmitter with integrated transducer for accurate level measurement for liquid applications	The Probe  • Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility:  - Three-wire system with alarm relay  - Two-wire system with current loop	4/141	SIMATIC PDM
Continuous measurement - Ultras	conic controllers			
123	The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.	SITRANS LUT420/430/440 In addition to industry leading 1 mm (0.04 inch) accuracy, each of the three models in the series are compatible with our full range of EchoMax transducers and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface.  • 1 mm accuracy • HART communications • Next Generation Sonic Intelligence	4/144	SIMATIC PDM
	Versatile short- to medium-range ultrasonic single- and dual-ves- sel level controller for virtually any application in a wide range of industries	MultiRanger 100/200     Using non-contacting ultrasonic technology, the controller measures the level in short to medium range applications up to 15 m (50 ft) of solids, liquids, or slurries     Auto False-Echo Suppression of false echoes		SIMATIC PDM
	Ultrasonic level controller for up to six pumps - control, differen- tial control, and open channel flow monitoring	HydroRanger 200     An economical, low-maintenance solution delivering control efficiency and productivity needed to meet to-day's exacting standards     Auto False-Echo Suppression of false echoes	4/156	SIMATIC PDM

	Application	Device description	Page	Programming Software
1887	Ultrasonic long-range level mon- itoring system for liquids and solids	SITRANS LU01/LU02 SITRANS LU10  • Automatic conversion of level into volume for standard or custom tank shapes • Easy to install and program • Optional fieldbus card, e.g. PROFIBUS DP	4/160 4/164	Dolphin Plus Dolphin Plus
TRAVILLA I	Output module for SITRANS LU10	SITRANS LU AO     SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver	4/168	
Continuous measurement - Ultras	onic transducers			
	ST-H: ETFE or PVDF transducer for chemicals XRS-5: Standard transducer for applications to 8 m (26 ft)	ST-H/EchoMax XRS-5  ST-H: The narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection  XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids, and slurries		
	Transducers for liquids and bulk solids XPS series: Hermetically sealed PVDF enclosure for chemical immunity	EchoMax XPS  • XPS series offers versions for various distances up to 30 m (100 ft) and up to a maximum temperature of 95 °C (203 °F)  The series of the se	4/178	
Continuous measurement - Radar	transmitters			
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft)	SITRANS Probe LR  Uni-Construction polypropylene rod antenna standard  Process Intelligence signal processing  Auto False-Echo Suppression of false echoes	4/194	SIMATIC PDM

	Application	Device description	Page	Programming Software
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft)	Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection Built-in alphanumeric display with support in four languages		SIMATIC PDM AMS SITRANS DTM
	transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); antenna designs ideal for small vessels, low dielectric media, food & beverages and corrosive/aggressive media  Simple operation using the graphical local user interface (LUI)  Plug-and-play setup using the intuitive Quick Start Wizard  25 GHz high frequency allows for small horn antennas and easy mounting in nozzles  Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions		4/213	SIMATIC PDM AMS SITRANS DTM
			4/269	SIMATIC PDM
	4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust  SITRANS LR460  • Process Intelligence for advanced signal processing and quick and easy adjustment • Self-guided Quick Start Wizard for plug and play start-up • 100 m (328 ft) range for long-range and difficult applications		4/274	SIMATIC PDM
	2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft)	SITRANS LR560  Rugged stainless steel design  78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids  Aimer option to direct beam to area of interest, such as draw point of cone  Air purge connection is included for self-cleaning of extremely sticky solids  Lens antenna is highly resistant to product build-up  Local display interface (LDI) allows local programming and diagnostics	4/280	SIMATIC PDM AMS SITRANS DTM

	Application	Device description	Page	Programming Software
Continuous measurement - Guide	ed wave radar transmitters			
	Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options.	SITRANS LG240/250/260/270  Measures accurately on materials with dielectric (dK) as low as 1.4  Guided wave radar measurement for up to 2 mm (0.08 inch) accuracy  Measures level, level/interface, and volume of solids, slurries, and liquids  4 button programming for quick setup  Reliable level measurement on harsh applications with pressure up to 400 bar g (40 000 kPa) and temperatures as high as 450 °C (842 °F)	4/289	SIMATIC PDM
Continuous level – Capacitance tr	ansmitters			
	For liquids and solids applica- tions, ideal for standard indus- trial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement indus- tries	SITRANS LC300 Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation	4/324	-
	Level and interface transmitter for extreme and critical process conditions, such as oil and liquid natural gas (LNG), toxic and aggressive chemicals and vapours	SITRANS LC500  • Equipped with the HART Smart protocol for remote setup and calibration  • Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation	4/338	SIMATIC PDM
Communications				
		SmartLinx Module, Dolphin Plus software     Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems     Dolphin Plus for quick and easy configuring, monitoring, tuning, and diagnostics of Siemens devices	4/362 4/363	-

**Product Overview** 

# Level Measurement Selector

Continuous Level						
Conditions	Ultrasonic	Radar	Guided Wave Radar	Capacitance	Gravimetric	Hydrostatic pressure
Measurement						
Level	-	-	•		•	
Interface (liquid/liquid)				<b>•</b>		•
Interface (liquid/solid)	<b>•</b>			<b>•</b>		
Volume	-	•	<b>•</b>	<b>•</b>	<b>*</b>	•
Mass						•
Flow (open channel)	-	•				
Level Applications						
Changing density						
Changing dielectric	-	-		<b>•</b>	-	
Aggressive chemicals	-	•		-	-	•
Pressure/vacuum		•				
High temperature		-		-		•
Cryogenic				•	-	
Turbulence	-	•	<b>*</b>	<b>*</b>	-	•
Steam		<b>•</b>	-	<b>*</b>	-	
Hydrocarbon vapors/solvents		•		-	-	•
Foam	•	•	<b>*</b>	<b>*</b>		
Build-up	•	•	<b>*</b>	<b>*</b>		<b>•</b>
High viscosity	-	•	<b>*</b>	•		<b>•</b>
Dust	•	•		-		
Solids powders	<b>•</b>	•	<b>*</b>	<b>*</b>		
Solids granules/pellets < 25 mm (1 inch)	•	•	<b>•</b>	•	•	
Solids > 25 mm (1 inch)	-				-	
High angle of repose	<b>•</b>			<b>*</b>	-	

### ■ preferred

◆ condition dependent

# Product Overview

# Level Measurement Selector

Point Level				
Conditions	Vibration	Capacitance	Paddle	Ultrasonic
Measurement				
Level			•	•
Interface (liquid/liquid)				
Interface (liquid/solid)	<b>•</b>	<b>•</b>		
Volume				
Mass				
Flow (open channel)				
Level Applications				
Changing density			•	•
Changing dielectric		<b>•</b>	•	•
Aggressive chemicals			•	
Pressure/vacuum			•	
High temperature			•	
Cryogenic				
Turbulence	<b>•</b>	<b>•</b>		•
Steam		<b>•</b>	-	
Hydrocarbon vapors/solvents		<b>•</b>		
Foam	<b>•</b>	<b>•</b>		•
Build-up	<b>•</b>	<b>•</b>	-	•
High viscosity	<b>•</b>	<b>•</b>	<b>*</b>	
Dust		•	-	<b>•</b>
Solids powders		<b>*</b>	-	<b>•</b>
Solids granules/pellets < 25 mm (1 inch)		<b>•</b>	•	•
Solids > 25 mm (1 inch)	<b>•</b>	<b>*</b>	-	•
High angle of repose		•	-	<b>•</b>

- preferred
- ◆ condition dependent

Point level measurement - RF Capacitance switches

RF Capacitance

#### Overview

#### Introduction

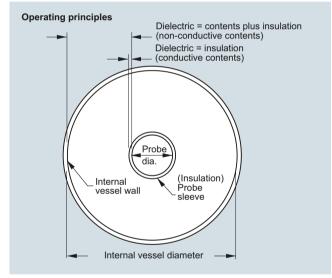
Inverse frequency shift capacitance point level and material detection switches are designed to withstand the harsh environments of high pressure and high temperature applications.

#### Inverse Frequency Technology

Siemens inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

#### Principle of Operation

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.



Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

### Mode of operation

#### **Common Terms**

#### Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

#### Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

#### Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

#### Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapor concentration, material buildup, dust, or condensation.

Point level measurement - RF Capacitance switches

# RF Capacitance

# Technical specifications

	Point Level Measurement			
Criteria	Pointek CLS100	Pointek CLS200	Pointek CLS300	Pointek CLS500
Typical applications	Liquids, slurries, powders, granules, applications in constricted spaces	Liquids, slurries, powders, granules, foam, food, and pharmaceuticals, petrochemi- cals	Liquids, slurries, powders, granules, relatively high pres- sure and temperature, hazard- ous areas	Water in oil level, foam or liquid/ foam level, glycol regenerators, high-pressure coalescers
Max. length including sensor	100 mm (4 inch)	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40 inch) Cable: 25 m (82 ft)	Rod: 1 m (40 inch)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	• Stainless steel process connection: -30 +100 °C (22+212 °F) • Fully Synthetic (PPS process connection): -10 +100 °C (14 212 °F)	• -40 +85 °C (-40 +185 °F) • With thermal isolator: -40 +125 °C (-40 +257 °F)	• -40 +200 °C (-40 +392 °F) • HT version: -40 +400 °C (-40 +752 °F)	• -50 +200 °C (-58 +392 °F) • HT version: -60 +400 °C (-76 +752 °F)
Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)	Up to 10 bar g (146 psi g)	Rod versions:     Up to 25 bar g (365 psi g)     Cable version:     Up to 10 bar g (146 psi g)	Up to 35 bar g (511 psi g)	• Up to 150 bar g (2 175 psi g)
Output	Stainless steel cable or enclosure version:  • 4 20/20 4 mA 2-wire current loop  • Solid-state output Fully-synthetic version (PPS)	Standard: • 1 SPDT Form C relay, solid-state switch Digital: • Solid-state switch included	Standard: • 1 SPDT Form C relay, solid-state switch Digital: • Solid-state switch included	4 20/20 4 mA 2-wire current loop     Solid-state switch
Communications	Relay output	Standard:	Standard:	HART, SIMATIC PDM
		3 LED indicators     Digital:     PROFIBUS PA;     SIMATIC PDM compatible	<ul> <li>3 LED indicators</li> <li>Digital:</li> <li>PROFIBUS PA;</li> <li>SIMATIC PDM compatible</li> </ul>	compatible
Power Specifications	Standard: • 12 33 V DC Intrinsically Safe (Stainless steel version only): • 10 30 V DC	Standard:  • 12 250 V AC/DC, 0 60 Hz, 2 W max. Digital: • Bus voltage: 12 30 V DC, IS version 12 24 V DC • Current consumption: 12.5 mA	Standard:  12 250 V AC/DC, 0 60 Hz, 2 W max.  Digital: Bus voltage: 12 30 V DC, IS version 12 24 V DC  Current consumption: 12.5 mA	• 12 33 V DC • 3.6 22 mA/ 22 3.6 mA (2-wire current loop)
Approvals	Stainless steel cable or enclosure version: CE, CSA, FM, ATEX, RCM, Lloyds Register, WHG Fully-synthetic version (PPS): CSA, FM	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II	CE, CSA, FM, ATEX, RCM, Lloyds Register, Bureau Veri- tas, Current Signaling accord- ing to NAMUR NE 43

Application

SIEMENS				
Capacitance Application	Questionnaire			
Customer information				
Contact:		Prepared By:		
Company:				
Address:		Notes on the Applic	ation:	
City: Count	ry:			
Zip/Postal Code: Phone	e: <u>(    )                                </u>			
E-mail: Fax: _	( )			
Tank/Vessel Information (Supply st	ketch where possible) Sketch	attached		
Type: Storage	Tank construction:		Dimensions:	
Process	Metallic Nor	ı-metallic	Height:	m/ft
☐ Separator	Agitated top, botto	om or side	Width/Diameter:	m/ft
	Pressure:			
☐ FPSO (Floating Processing	Normal:		Critical Information	
Storage and Offloading)	Maximum (relief):		Nozzle Length:	cm/inch
Tank top: Open Tank bottom:	Sloped Mountin	g: Top Mount	Nozzle Diameter:	cm/inch
. □ Flat	□ Flat	☐ Side Mount	TTO E I I I I I I I I I I I I I I I I I I	
☐ Conical	☐ Conical	☐ Pipe Mount		
☐ Parabolic	Parabolic			
Process Data				. 🗆 🞳
Material being measured:				d ∐ Slurry
Material temperature: Norm:	°C/°F Max:	°C/°F		
Measurement type: Point level Continuous le	Constant dielectr	ic: No Ye	s DK Value	
	Upper material:		DK Value	
☐ Interface leve	Lower material:		DK Value	
Process pressure: Min		mospheric steam:		
Coating build-up: No Yes (	г	□ No □ Yes		
Installation (indicate all that apply) Power available:				
Outputs required:		Communication	nns	
	lid state	HART / 4		BUS PA
Products recommended:  © Siemens Milltronics Process Instruments Inc.	www.siamans.co	om/processautomation		Update 03/2015
Signation with the strategy of the strain of	W W W.Siciliciis.Co	Jiii pi oceasautoination		Opuale 03/2013

Capacitance Application Questionnaire

Point level measurement - RF Capacitance switches

#### Pointek CLS100

#### Overview



Pointek CLS100 is a compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on probe.

#### Benefits

- · Easy installation with verification by built-in LED
- · Low maintenance with no moving parts
- · Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

### Application

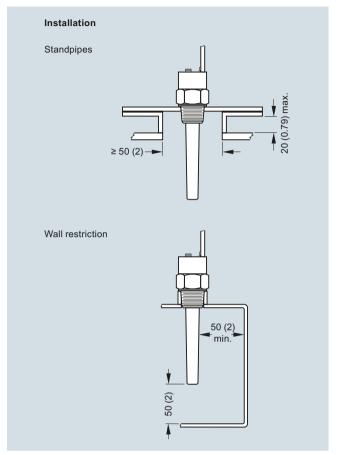
Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

 Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

### Configuration



Pointek CLS100 installation, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

Pointek CLS100

# Technical specifications

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
Output		
Output signal  Alarm output	4 20/20 4 mA 2-wire loop	4 20/20 4 mA 2-wire loop
• Switch output <sup>1)</sup>	Solid-state: 30 V DC/30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
Fail-safe mode	Min. or max.	Min. or max.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions <sup>2)</sup>		
Installation conditions  • Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions  • Ambient temperature	-30 +85 °C (-22 +185 °F)	-10 +85 °C (14 185 °F)
<ul><li>Installation category</li><li>Pollution degree</li></ul>	4	4
Medium conditions • Relative dielectric constant ε <sub>r</sub>	Min. 1.5	Min. 1.5
Process temperature	-30 +100 °C (-22 +212 °F)	-10 +100 °C (14 212 °F)
• Pressure (vessel)	-1 +10 bar g (-14.6 +146 psi g), nominal <sup>2)</sup>	-1 +10 bar g (-14.6 +146 psi g), nominal
Degree of protection		
- Enclosure version - Integral cable version		IP68/Type 4/NEMA 4 Not applicable
Cable inlet	½" NPT (M20x1.5 optional)	½" NPT (M20x1.5 optional)
Design		
	Enclosure/Integral cable version	Fully synthetic version
Material		
<ul> <li>Body (Enclosure version)</li> </ul>	Thermoplastic polyester	Thermoplastic polyester
<ul><li>Lid (Enclosure version)</li><li>Integrated cable body</li></ul>	Transparent thermoplastic polycarbonate (PC) 316L stainless steel	Transparent thermoplastic polycarbonate (PC) Not applicable
(Integral cable version)		· ·

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts <sup>3)</sup>	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF) <sup>4)</sup>	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20x1.5 optional	Removable internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm <sup>2</sup> (22 AWG), shielded, polyester jacket	Not applicable
Process connection	%" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	%" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
Power supply		
Standard	12 33 V DC	12 33 V DC
Intrinsically Safe	10 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals	General: CE, CSA, FM, RCM Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 Intrinsically Safe (barrier required): CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4 ATEX II 1 GD 1/2GD EEX ia IIC T4 to T6 T107 °C Overfill protection: WHG (Germany)	General: CSA, FM

- When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.
- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/13.
- 3) For Caustic Materials please contact ceg.smpi@siemens.com http://www.siemens.com/automation/support-request for alternative O-rings
- $^{4)}$  When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

# Point level measurement - RF Capacitance switches

### Pointek CLS100

Selection and Ordering data		Arti	cle	Ν	Ю.
Pointek CLS100, stainless steel process connection		7M	L55	01	1-
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on probe.		0			
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.					
Process connection  3/4" NPT [(Taper), ANSI/ASME B1.20.1]  R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]  G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		A E J			
Approvals					
General Purpose: CE, CSA, FM, RCM CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C 1)	•		A C		
CSA/FM Class II and III, Div. 1, Groups E, F, G <sup>1)</sup>	•		G		
Device version Integral cable version (PPS probe) Enclosure version (PPS probe), ½* NPT cable inlet Integral cable version with PVDF probe body Enclosure version with PVDF probe body (½* NPT cable inlet)	• • • •		1 3 5 6		
Enclosure version (PPS probe), M20 x 1.5 cable inlet	•		7		
Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	•		8		
Overfill protection  Not required	•			0	
Required	•			1	

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring <sup>1)</sup>	A22
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
Quick start manual, multi-language Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.	A5E32146158

- 1) See Temperature restriction on page 4/16
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

_		
	Selection and Ordering data	Article No.
	Accessories	
	SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread	7ML1830-1DL
	SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with 3/4" NPT thread	7ML1830-1DM
	Tag, stainless steel, $12 \times 45 \text{ mm}$ (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
	Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
	½" NPT cable gland, nickel plated brass, fits cable diameter 6 12 mm (0.24 0.47 inch) -40 +100 °C (-40 +212 °F), IP68 (General Purpose)	7ML1830-1JA
	M20 x 1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 12 mm (0.28 0.47 inch), -20 +70 °C (-4 +158 °F), IP68 (General Purpose)	7ML1830-1JC

Article No.

Selection and Ordering data

Pointek CLS100, PPS process connection		7ML5610-
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on probe.		0
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection (PPS)		
3/4" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body)		A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)		В
Approvals		
General Purpose: CSA, FM	•	D
Versions/Options		
Enclosure version, PPS process connection, 1/2" NPT cable inlet		1
Enclosure version, PPS process connection, M20 x 1.5	•	2
Overfill protection		
Not required	•	0
Required	•	1

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring <sup>1)</sup>	A22
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
Quick start manual, multi-language Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.	A5E32146158
Accessories  SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread  SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread  Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures	7ML1830-1DL 7ML1830-1DM 7ML1930-1AC

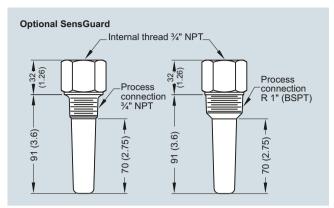
<sup>1)</sup> See Temperature restriction on page 4/16

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Point level measurement - RF Capacitance switches

Pointek CLS100

# Options

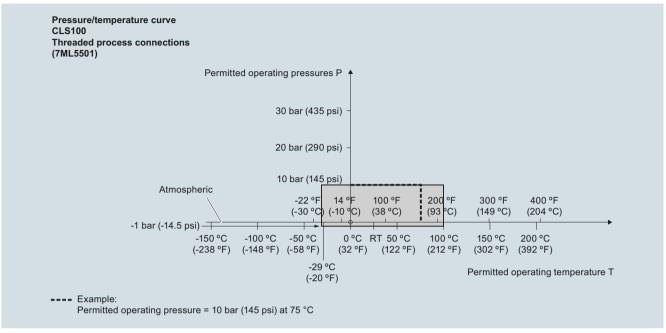


Optional SensGuard, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

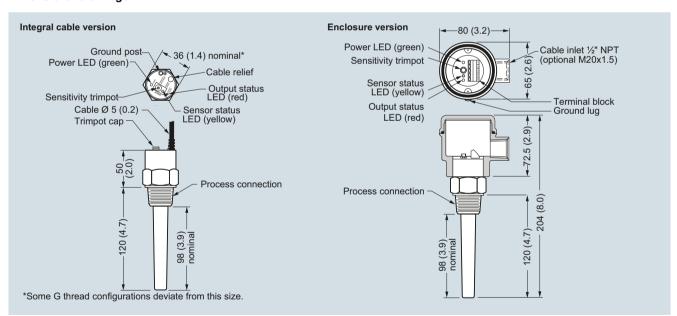
#### Pointek CLS100

#### Characteristic curves



Pointek CLS100 Process Pressure/Temperature derating curves

### Dimensional drawings

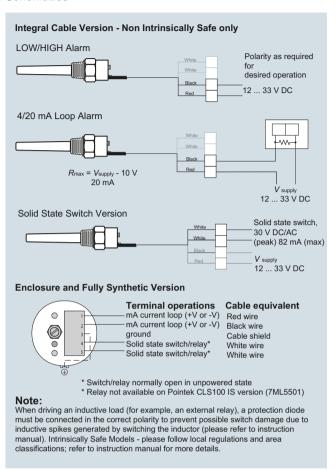


Pointek CLS100, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

Pointek CLS100

# Schematics



Pointek CLS100 connections

Point level measurement - RF Capacitance switches

#### Pointek CLS200 - Standard

#### Overview



Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam and interfaces and has the ability to tune out build-up on the probe.

#### Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power

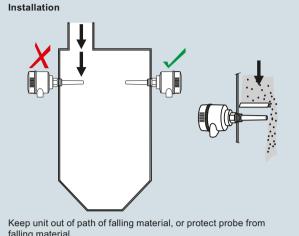
### Application

Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms. Universal switch for solids/liquids and interface.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

 Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

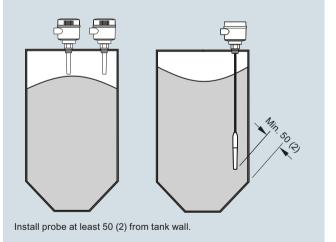
### Configuration



falling material.



Avoid areas where material build up occurs.



Pointek CLS200 installation, dimensions in mm (inch)

### Point level measurement - RF Capacitance switches

### Pointek CLS200 - Standard

# Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material • Enclosure • Optional thermal isolator	Epoxy-coated aluminum with gasket 316L stainless steel
Measured variable	Change in picoFarad (pF)	Connection	Removable terminal block,
Output	g p (p. )		max. 2.5 mm <sup>2</sup>
Output signal		Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Relay output     Max. contact voltage	1 SPDT Form C relay  • 30 V DC  • 250 V AC	Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
- Max. contact current	• 5 A DC • 8 A AC	Power supply	12 250 V AC/DC, 0 60 Hz max. 2 W
- Max. switching capacity	150 W DC	Certificates and approvals	
	2 000 VA AC	General Purpose	CSA, FM, CE, RCM
<ul><li>Time delay (ON and/or OFF)</li><li>Solid-state output</li></ul>	1 60 s	Dust Ignition Proof	ATEX II 1/2 D T100 °C
- Output - Protection	Galvanically isolated Against reversed polarity (bipolar)	Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6 T4 ATEX II 1/2 D T100 °C
- Max. switching voltage	• 30 V DC • 30 V peak AC	Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G
- Max. load current	82 mA		CSA/FM Class III T4
<ul><li>Voltage drop</li><li>Time delay (pre or post switching)</li></ul>	< 1 V, typical at 50 mA 1 60 s	Explosion Proof Enclosure With IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D
Rated operating conditions <sup>1)</sup>			CSA/FM Class II, Div. 1, Groups E, F, G
Installation conditions			CSA/FM Class III T4
Location	Indoor/outdoor	Marine	Lloyds Register of Shipping,
Ambient conditions	20		Categories ENV1, ENV2 and ENV5
Ambient temperature     Installation category	-40 +85 °C (-40 +185 °F) <sup>2)</sup>	Overfill Protection	WHG (Germany) VLAREM II
Pollution degree	4	Others	Pattern Approval (China)
Medium conditions	Liquids, bulk solids, slurries and interfaces	1) When operation is in areas classified	ed as hazardous, observe restrictions

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
  See also Pressure/Temperature curves on page 4/37.
- $^{2)}$  Thermal isolator is used if process connection temperature exceeds 85  $^{\circ}\text{C}$ (185 °F)
- 3) Pressure rating of process seal is temperature dependent. See Pressure/ Temperature curves on page 4/37.

• Relative dielectric constant  $\epsilon_{\text{r}}$ 

- Without thermal isolator

• Process pressure (rod version)

• Process pressure (cable version)3)

• Process pressure (sliding coupling

- With thermal isolator

• Process temperature

Electromagnetic Compatibility

interfaces

Min. 1.5

-40 ... +85 °C (-40 ... +185 °F) $^{2)}$ -40 ... +125 °C (-40 ... +257 °F)

-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)

-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)

-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)

To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction

Point level measurement - RF Capacitance switches

Design: Probe				
	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	R ¾", 1", 11/4", 11/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
	34", 1", 11/4", 11/2" NPT [(Taper), ANSI/ASME B1.20.1] G 3/4', 1", 11/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		%", 1", 1½", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G %", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	%", 1", 1½", 1½" NPT ((Taper), ANSI/ASME B1.20.1] G %", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
	316L stainless steel ASME/EN flange		316L stainless steel ASME/EN flange	
Extension material	316L stainless steel optional PFA coated <sup>1)</sup>	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator3)	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

<sup>1)</sup> PFA coating (7ML5634 and 7ML5644) has 120 micron thickness.

<sup>&</sup>lt;sup>2)</sup> For Caustic Materials please contact ceg.smpi@siemens.com for alternative O-rings

 $<sup>^{3)}</sup>$  Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

# Point level measurement - RF Capacitance switches

Selection and Ordering data	Article No.	_
Pointek CLS200 - Standard - Rod Version with	7ML5630-	
Threaded or Flanged process connection		ı
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/		
cable choices and configurable output. CLS200 is		
ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-		
up on the probe.		
Process connection Threaded, 316L stainless steel		Ī
	0 A	
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B 0 C	
	0 D	
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A	
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B	
G 34" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0203]		
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	
Welded flange, 316L stainless steel, raised face		
	5 A	
1" ASME, 300 lb 1" ASME, 600 lb	5 B 5 C	
	5 D	
1½" ASME, 300 lb	5 E	
1½" ASME, 600 lb	5 F	
2" ASME, 150 lb 2" ASME, 300 lb	5 G 5 H	
2" ASME, 600 lb	5 J	
0 7.0.1.2, 100.10	5 K	
3" ASME, 300 lb 3" ASME, 600 lb	5 L 5 M	
	5 N	
4" ASME, 300 lb	5 P	
4" ASME, 600 lb	5 Q	
Welded flange, 316L stainless steel, Type A flat faced		
	6 A	
DN 25, PN 40 DN 40, PN 16	6 B	
DN 40, PN 40	6 D	
DN 50, PN 16	6 E	
DN 50, PN 40	6 F	
DN 80, PN 16 DN 80, PN 40	6 G 6 H	
	6 J	
DN 100, PN 40	6 K	
(Note: Flange bolting patterns and facings		
dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for		
standard lengths		
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]	A	
Extended rod, 250 mm (9.84 inch)	В	
2.xto.raca roa, oco min (rom o mon)	C	
Exteriaca roa, ooo miii (15.65 mon)	DE	
	F	
Exterior 100, 1 200 mm (10:21 mon)	G	
2,001,000,1000,1111 (00110 111011)	H	
Extended rod, 1 750 mm (68.90 inch)	K	
Extended rod, 2 000 mm (78.74 inch)	L	

Pointek C	LO	200	- J	lalli	Qe	10
Selection and Ordering data		Artic	le N	lo.		
Pointek CLS200 - Standard - Rod Version with		7ML				_
Threaded or Flanged process connection		/ IVIL				^
Versatile inverse frequency shift capacitance leve	ı		_		т	U
and material detection switch with optional rod/						
cable choices and configurable output. CLS200 is	3					
ideal for detection of liquids, solids, slurries, foam						
and interfaces, and has the ability to tune out build	d-					
up on the probe.						
Add Order code Y01 and plain text: "Insertion length mm"						
Extended rod, 210 1 000 mm (8.27 39.37 inch)		N				
Extended rod, 1 001 2 000 mm		Ň				
(39.41 78.74 inch)						
Extended rod, 2 001 3 000 mm		P	)			
(78.78 118.11 inch) Extended rod, 3 001 4 000 mm	•	c				
(118.15 157.48 inch)	_	ď				
Extended rod, 4 001 5 000 mm	•	F				
(157.52 196.85 inch)						
Extended rod, 5 001 5 500 mm (196.89 216.53 inch)		S				
Thermal isolator						
Without thermal isolator			0			
With thermal isolator [for process connection	•		1			
temperatures over 85 °C (185 °F)]						
Remote mount electronics and						
mounting bracket						
With 2 m (79 inch) of cable <sup>1)</sup>			2			
With 5 m (197 inch) of cable <sup>1)</sup>	•		3			
Wetted seals						
FKM FFKM [for process temperatures above -20 °C (-4 °F	=\1		0 1			
Probe material	/] =		·			
316L stainless steel with PPS probe body				0		
316L stainless steel with PVDF probe body	•			1		
Approvals						
Dust Ignition Proof:	•				С	
CE, RČM, ATEX II 1/2 D T100 °C						
Flameproof Enclosure with IS Probe:					D	
CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 T4,						
ATEX II 1/2 D T100 °C						
Flameproof Enclosure with IS Probe, with WHG approval:					E	
CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 T4,						
ATEX II 1/2 D T100 °C						
Dust Ignition Proof with IS Probe:					F	
CSA/FM Class II, Div. 1, Groups E, F, G						
CSA/FM Class III 14						
Explosion Proof Enclosure with IS Probe:				(	G	
CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G						
CSA/FM Class III T4						
General Purpose (CSA, FM)	•				н	
General Purpose (CE, RCM)					J	
General Purpose (CSA, FM, CE, RCM)	•				K	
with WHG approval	_					
Enclosure and lid						
Aluminum epoxy coated						
2 x ½" NPT via adapter - cable inlet, IP65	•				A	
2 x M20 x 1.5 cable inlet IP65	-				В	
2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet IP68					C	
Z A IVIZU A 1.0 CADIC II IICL IF UO	_				U	

 $<sup>^{1)}\,</sup>$  Available with Approvals options F  $\dots$  H

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Point level measurement - RF Capacitance switches

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length • in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

	A .:	1 NI
Selection and Ordering data Pointek CLS200 - Standard - Cable Version with		cle No.
Threaded or Flanged process connection		.5631- 0
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/		
cable choices and configurable output. CLS200 is		
ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-		
up on the probe.		
Process connection Threaded, 316L stainless steel		
3/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 A	
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B	
11/4" NPT [(Taper), ANSI/ASME B1.20.1]		
1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]  G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P),		
JIS B 0202]		
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb 1" ASME, 300 lb	5 A 5 B	
1" ASME, 600 lb	5 C	
1½" ASME, 150 lb	5 D	
1½" ASME, 300 lb	5 E	
1½" ASME, 600 lb 2" ASME, 150 lb	5 F 5 G	
2" ASME, 300 lb	5 H	
2" ASME, 600 lb	5 J	
3" ASME, 150 lb 3" ASME, 300 lb	0	
3" ASME, 600 lb	5 L 5 M	
4" ASME, 150 lb		
4" ASME, 300 lb 4" ASME, 600 lb	5 P 5 Q	
Welded flange, 316L stainless steel,	- J Q	
Type A flat faced		
DN 25, PN 16 DN 25, PN 40	6 A 6 B	
DN 40, PN 16	1 4	
DN 40, PN 40	6 D	
DN 50, PN 16 DN 50, PN 40	6 E 6 F	
DN 80, PN 16		
DN 80, PN 40	6 H	
DN 100, PN 16		
DN 100, PN 40 (Note: Flange bolting patterns and facings	6 K	
dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for		
standard lengths		
Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly <sup>1)</sup>		A
Extended cable, 6 000 mm (236.22 inch), length		В
can be determined by customer on assembly <sup>1)</sup>		
Add Order code Y01 and plain text:		
"Insertion length mm"  Extended cable, 500 5 000 mm		
(19.69 196.85 inch)		C
Extended cable, 5 001 10 000 mm (196.89 393.70 inch)		D
(196.89 393.70 inch) Extended cable, 10 001 15 000 mm		E
(393.74 590.55 inch)		
Extended cable, 15 001 20 000 mm (590.59 787.4 inch)		F
Extended cable, 20 001 25 000 mm (787.44 984.25 inch)		G
Extended cable, 25 001 30 000 mm (984.29 1 181.1 inch)		н

# Point level measurement - RF Capacitance switches

		A 1. 1				_
Selection and Ordering data		Article				
Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection		7ML5				
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build up on the probe.	-					0
Thermal isolator						
Without thermal isolator	•		)			
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•					
Remote mount electronics and mounting						
<b>bracket</b> With 2 m (79 inch) of cable <sup>2)</sup>						
With 5 m (197 inch) of cable <sup>2)</sup>	•		3			
Wetted seals	_		•			
FKM and PTFE			0			
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	•		1			
Probe material						
FEP jacketed cable with PPS probe body	•			0		
FEP jacketed cable with PVDF probe body	•			1		
Approvals						
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	•			(	С	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•			١	D	
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•				E	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•			(	G	
General Purpose (CSA, FM)	•				Н	
General Purpose (CE, RCM)	•				J	
General Purpose (CSA, FM, CE, RCM) with WHG approval	•			ı	K	
Enclosure and lid						
Aluminum epoxy coated						
2 x ½" NPT via adapter - cable inlet, IP65	•				Α	
2 x M20 x1.5 cable inlet, IP65	•				В	•
2 x ½" NPT via adapter - cable inlet, IP68	•				C	
2 x M20 x1.5 cable inlet, IP68	•				D	

1)	Sensor	detached to	allow	customer	to s	set	desired	cable	length
----	--------	-------------	-------	----------	------	-----	---------	-------	--------

<sup>&</sup>lt;sup>2)</sup> Available with Approvals options F ... H

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

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# Point level measurement - RF Capacitance switches

Selection and Ordering data		Arti	cle	No	).	
Pointek CLS200 - Standard - Rod with		7M	L56	32	-	
Sanitary process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional rod/			1	-		0
cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.						
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Process connection Sanitary 316L stainless steel						
1" sanitary fitting clamp 1½" sanitary fitting clamp 2" sanitary fitting clamp	•	8 A 8 B 8 C				
2½" sanitary fitting clamp 3" sanitary fitting clamp (Note: Sanitary connection dimensionally	•	8 D 8 E				
corresponds to the applicable ISO 2852 standard)						
Probe length (length from process connection face)						
00111pagt 00 111111 (0.00 111011)	•		Α			
	•		B C			
Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch)	•		D E F			
Extended rod, 1 350 mm (53.15 inch)	•		G H J			
<u> </u>	•		K L			
Add Order code Y01 and plain text: "Insertion length mm"  The ded and 110 250 mm (4.2 12.70 insh)						
Extended rod, 351 1 000 mm (13.78 39.37 inch)	•		M N P			
(78.78 118.11 inch)	•		Q R			
(118.15 157.48 inch) Extended rod, 4 001 5 000 mm	•		S			
(157.52 196.85 inch) Extended rod, 5 001 5 500 mm (196.89 216.53 inch)	•		т			
William Bolato	•		0			
Remote mount electronics and mounting bracket Remote mount electronics with 2 m (79 inch)	•		2			
of cable <sup>1)</sup> Remote mount electronics with 5 m (197 inch) of cable <sup>1)</sup>	•		3			
Wetted seals	_					
	•			1		
o roz diamiodo diodi wili i i o probo body	•				0	

Selection and Ordering data	Article No.	
Pointek CLS200 - Standard - Rod with Sanitary process connection	7ML5632-	
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		0
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C		С
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 T4, ATEX II 1/2 D T100 °C		D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 T4, ATEX II 1/2 D T100 °C		E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		G
General Purpose (CSA, FM)		н
General Purpose (CE, RCM)		J
General Purpose (CSA, FM, CE, RCM) with WHG approval		К
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65		A B
2 x ½" NPT via adapter - cable inlet, IP68		С
2 x M20x1.5 cable inlet, IP68		D

- $^{1)}\,$  Available with Approvals options F  $\dots$  H
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	01401 0040
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

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# Point level measurement - RF Capacitance switches

### Pointek CLS200 - Standard

Soloation and Ordering data		Λrt	مام	NI		
Selection and Ordering data		Arti				
Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection						
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build up on the probe.	-				Ī	
✓ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.						
Process connection Threaded, 316L stainless steel						
3/4" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 A 0 B 0 C				
1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	0 D 1 A 1 B				
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	]	1 D 3 A 3 B 3 D				
Probe length (length from flange face) (threaded lengths include process thread)						
Note: No Y01 needed in Order code for standard lengths						
Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch)	• • •		C D E			
Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch)	• • •		F G H			
Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	• • •		J K L			
Add Order code Y01 and plain text: "Insertion length mm"						
Extended rod, 350 1 000 mm	•		M			
(13.78 39.37 inch) Extended rod, 1 001 2 000 mm (39.41 78.74 inch)	•		N			
Extended rod, 2 001 3 000 mm (78.78 118.11 inch)	•		Р			
Extended rod, 3 001 4 000 mm (118.15 157.48 inch)	•		Q			
Extended rod, 4 001 5 000 mm (157.52 196.85 inch)	•		R			
Extended rod, 5 001 5 500 mm (196.89 216.53 inch)	•		S			
Thermal isolator Without thermal isolator	•		0			
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]			1			
Remote mount electronics and mounting bracket						
With 2 m (79 inch) of cable <sup>1)</sup> With 5 m (197 inch) of cable <sup>1)</sup>	•		3			
Wetted seals FKM and PTFE FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	•			0 1		
Probe material						
316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body	•				0 1	

Selection and Ordering data	Article N	lo.
Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection	7ML5633	3- - <b>0</b> 0
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.		Ш
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	•	С
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C		D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C		E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		G
General Purpose (CSA, FM)	•	Н
General Purpose (CE, RCM)	•	J
General Purpose (CSA, FM, CE, RCM) with WHG approval	•	K
Enclosure and lid Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68		A B C D
1) * "		

- $^{1)}$  Available with Approvals options F ... H
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
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Point level measurement - RF Capacitance switches

# Pointek CLS200 - Standard

Selection and Ordering data  Article No.  Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.  Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
with PFA Coated Flanged process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.  ✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build- up on the probe.  Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.  Process connection Welded flange, 316L stainless steel, raised face 1" ASME, 150 lb  5 A
cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.  Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
and interfaces, and has the ability to tune out build- up on the probe.  ✓ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
up on the probe.  ✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
tion in the PIA Life Cycle Portal.  Process connection  Welded flange, 316L stainless steel, raised face  1" ASME, 150 lb  5 A
Process connection Welded flange, 316L stainless steel, raised face 1" ASME, 150 lb 5 A
Welded flange, 316L stainless steel, raised face 1" ASME, 150 lb 5 A
1" ASME, 150 lb 5 A
1" ASME, 300 lb 1" ASME, 600 lb
1½" ASME, 150 lb
1½" ASME, 300 lb 1½" ASME, 600 lb 5 F
2" ASME, 150 lb 5 <b>G</b>
2" ASME, 300 lb 2" ASME, 600 lb
3" ASME, 150 lb 5 K
3" ASME, 300 lb 3" ASME, 600 lb
4" ASME, 150 lb 5 N
4" ASME, 300 lb 4" ASME, 600 lb
Welded flange, 316L stainless steel,
Type A flat faced
DN 25, PN 16 DN 25, PN 40 6 B
DN 40, PN 16 6 C
DN 40, PN 40 DN 50, PN 16 6 E
DN 50, PN 40 6 F
DN 80, PN 16 DN 80, PN 40 6 H
DN 100, PN 16 6 J
DN 100, PN 40 (Note: Flange helting patterns and facings)
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)
Probe length (length from flange face)
(threaded lengths include process thread)
Note: No Y01 needed in Order code for standard lengths
Compact 98 mm (3.86 inch)
Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch)
Extended rod, 500 mm (19.69 inch)
Extended rod, 750 mm (29.53 inch)  Extended rod, 1 000 mm (39.37 inch)
Extended rod, 1 250 mm (49.21 inch)
Extended rod, 1 350 mm (53.15 inch)
Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch)
Extended rod, 2 000 mm (78.74 inch)
Add Order code Y01 and plain text: "Insertion length mm"
Extended rod, 200 1 000 mm M
(7.87 39.37 inch) Extended rod, 1 001 2 000 mm
(39.41 78.74 inch) Extended rod, 2 001 3 000 mm
(78.78 118.11 inch)
Extended rod, 3 001 4 000 mm (118.15 157.48 inch)
Extended rod, 4 001 5 000 mm
(157.52 196.85 inch) Extended rod, 5 001 5 500 mm
(196.89 216.53 inch)

Selection and Ordering data	Article No.	•
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	7ML5634-	0
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.		
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1	
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable With 5 m (197 inch) of cable	2 3	
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0	
Probe material PFA Coated 316L stainless steel with PPS probe body PFA Coated 316L stainless steel with PVDF probe body		0
Approvals		
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		G
General Purpose (CSA, FM)		Н
Enclosure and lid Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68		A B C D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

Point level measurement - RF Capacitance switches

Pointek CLS200 - Digital

#### Overview



Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam and interfaces and has the ability to tune out build-up on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

#### Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- · High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

#### Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

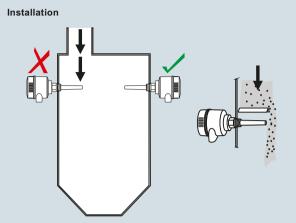
The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

 Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

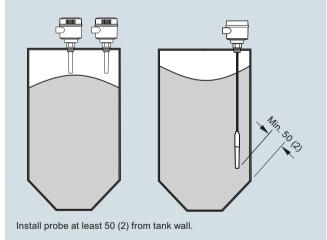
#### Configuration



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Pointek CLS200 installation, dimensions in mm (inch)

# Point level measurement - RF Capacitance switches

## Pointek CLS200 - Digital

# Technical specifications

Mode of operation		Power supply		
Measuring principle	Inverse frequency shift capacitive level detection	Bus voltage	Standard: 12 30 V DC Intrinsically Safe: 12 24 V DC	
Input		Current consumption	12.5 mA	
Measured variable	Change in picoFarad (pF)	Certificates and approvals		
Output		General Purpose	CSA, FM, CE, RCM	
Output signal • Solid-state output		Dust Ignition Proof	ATEX II 1/2 D T100 °C	
<ul><li>Output</li><li>Protection</li><li>Max. switching voltage</li></ul>	Galvanically isolated Against reversed polarity (bipolar)  • 30 V (DC)	Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	
- Max. load current	• 30 V peak (AC) 82 mA	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 T4 ATEX II 1/2 D T100 °C	
Voltage drop     Time delay (ON and/or OFF)     Fail-safe mode     Connection	< 1 V, typical at 50 mA Programmable by user (0 100 s) Min. or max. Removable terminal block	Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	
Rated operating conditions <sup>1)</sup>		Intrinsically Safe <sup>4)</sup>	ATEX II 1 G EEx ia IIC T6 T4	
Installation conditions • Location			ATEX II 1/2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D	
Ambient conditions  • Ambient temperature  • Installation category	-40 +85 °C (-40 +185 °F) <sup>2)</sup>		CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	
Pollution degree	4	Non-incendive	CSA/FM Class I, Div. 2,	
Medium conditions	Liquids, bulk solids, slurries and interfaces		Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	
• Relative dielectric constant $\epsilon_{r}$ • Process temperature	Min. 1.5	Non-Sparking	ATEX II 3 G Ex nA II T6 T4 ATEX II 2 D IP6X T100 °C	
<ul><li>Without thermal isolator</li><li>With thermal isolator</li></ul>	-40 +85 °C (-40 +185 °F) <sup>2)</sup> -40 +125 °C (-40 +257 °F)	Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5	
• Process pressure (rod version)	-1 +25 bar g (-14.6 +365 psi g) (nominal)	Others	Pattern Approval (China)	
• Process pressure (cable version) <sup>3)</sup>	-1 +10 bar g (-14.6 +150 psi g) (nominal)	Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2)	
<ul> <li>Process pressure (sliding coupling version)</li> </ul>	-1 +10 bar g (-14.6 +150 psi g) (nominal)		Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA profile	
Design			for Process Control Devices Version	
Material • Enclosure • Optional thermal isolator	Epoxy-coated aluminum with gasket 316L stainless steel	1) When operation is in areas classifi	3.0, Class B FISCO field device ed as hazardous, observe restrictions	
Connection	Removable terminal block, max. 2.5 mm <sup>2</sup>	according to relevant certificate. So page 4/37.	ee also Pressure/Temperature curves or	
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)	<li>Thermal isolator is used if process (185 °F)</li>	connection temperature exceeds 85 °C	
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)	<ul> <li>3) Pressure rating of process seal is temperature dependent. See P Temperature curves on page 4/37.</li> <li>4) Barrier or Intrinsically Safe power supply required for Intrinsically protection</li> </ul>		
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.			

- °С
- protection

# Point level measurement - RF Capacitance switches

# Pointek CLS200 - Digital

Design: Probe				
	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R %", 1", 11/4", 11/2 inch [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 3", 1", 11/4", 11/2" NPT [(Taper), ANSI/ASME B1.20.1] G %", 1", 11/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated <sup>1)</sup>	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator <sup>3)</sup>	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

<sup>1)</sup> PFA coating (7ML5634 and 7ML5644) has 120 micron thickness

 $<sup>^{2)}\,</sup>$  For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings

 $<sup>^{3)}</sup>$  Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

Point level measurement - RF Capacitance switches

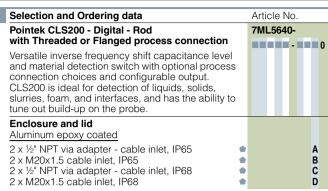
# Pointek CLS200 - Digital

Selection and Ordering data Article No.						
Pointek CLS200 - Digital - Rod			7ML5640-			
with Threaded or Flanged process connection  Versatile inverse frequency shift capacitance level				T	п	0
and material detection switch with optional process connection choices and configurable output.	3					
CLS200 is ideal for detection of liquids, solids,						
slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	)					
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.						
Process connection Threaded, 316L stainless steel						
3/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 A				
1" NPT [(Taper), ANSI/ASME B1.20.1] 11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 B				
1½" NPT [(Taper), ANSI/ASME B1.20.1]	•					
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	1 A 1 B				
R 11/2" [(BSPT), EN 10226/PT (JIS-T),	•	1 D				
JIS B 0203] G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202	] 🔷	3 A				
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 B				
G 11/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 D				
Welded flange, 316L stainless steel, raised face						
1" ASME, 150 lb 1" ASME, 300 lb		5 A 5 B				
1" ASME, 600 lb		5 C				
1½" ASME, 150 lb 1½" ASME, 300 lb		5 D 5 E				
1½" ASME, 600 lb 2" ASME, 150 lb		5 F 5 G				
2" ASME, 300 lb	_	5 H				
2" ASME, 600 lb 3" ASME, 150 lb	•	5 J 5 K				
3" ASME, 300 lb	_	5 L				
3" ASME, 600 lb 4" ASME, 150 lb	•	5 M 5 N				
4" ASME, 300 lb	_	5 P				
4" ASME, 600 lb Welded flange, 316L stainless steel,		5 Q				
Type A flat faced						
DN 25, PN 16 DN 25, PN 40		6 A 6 B				
DN 40, PN 16	•	6 C				
DN 40, PN 40 DN 50, PN 16	•	6 D 6 E				
DN 50, PN 40	•	6 F				
DN 80, PN 16 DN 80, PN 40		6 G 6 H				
DN 100, PN 16 DN 100, PN 40	•	6 J 6 K				
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)						
Probe length (length from flange face) (threaded lengths include process thread)						
Note: No Y01 needed in Order code for						
standard lengths Compact [threaded 120 mm (4.72 inch),	•		Α			
Flanged 98 mm (3.86 inch)] Extended rod, 250 mm (9.84 inch)	•		В			
Extended rod, 350 mm (13.78 inch)	•		С			
Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch)	•		D E			
Extended rod, 1 000 mm (39.37 inch)	•		F			
Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch)	•		G H			
Extended rod, 1 500 mm (59.06 inch)	•		J			
Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	•		K L			
` '						

Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output.  CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.  Add Order code Y01 and plain text:  "Insertion length mm"  Extended rod, 210 1 000 mm (8.27 39.37 inch)  Extended rod, 2 001 2 000 mm (39.41 78.74 inch)  Extended rod, 3 001 4 000 mm (78.78 118.11 inch)  Extended rod, 3 001 4 000 mm (118.15 157.48 inch)  Extended rod, 4 001 5 000 mm (157.52 196.85 inch)  Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator  Without thermal isolator  Without thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket  With 2 m (79 inch) of cable  Wetted seals
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output.  CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.  Add Order code Y01 and plain text:  "Insertion length mm"  Extended rod, 210 1 000 mm (8.27 39.37 inch)  Extended rod, 1 001 2 000 mm (39.41 78.74 inch)  Extended rod, 2 001 3 000 mm (78.78 118.11 inch)  Extended rod, 3 001 4 000 mm (118.15 157.48 inch)  Extended rod, 4 001 5 000 mm (157.52 196.85 inch)  Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator  With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket  With 2 m (79 inch) of cable  With 5 m (197 inch) of cable  With 5 m (197 inch) of cable
"Insertion length mm"  Extended rod, 210 1 000 mm (8.27 39.37 inch) Extended rod, 1 001 2 000 mm (39.41 78.74 inch) Extended rod, 2 001 3 000 mm (78.78 118.11 inch) Extended rod, 3 001 4 000 mm (118.15 157.48 inch) Extended rod, 4 001 5 000 mm (157.52 196.85 inch) Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket With 2 m (79 inch) of cable With 5 m (197 inch) of cable  2 With 5 m (197 inch) of cable
Extended rod, 210 1 000 mm  (8.27 39.37 inch)  Extended rod, 1 001 2 000 mm  (39.41 78.74 inch)  Extended rod, 2 001 3 000 mm  (78.78 118.11 inch)  Extended rod, 3 001 4 000 mm  (118.15 157.48 inch)  Extended rod, 4 001 5 000 mm  (157.52 196.85 inch)  Extended rod, 5 001 5 500 mm  (196.89 216.53 inch)  Thermal isolator  Without thermal isolator  With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket  With 2 m (79 inch) of cable  With 5 m (197 inch) of cable  3
Extended rod, 2 001 3 000 mm (78.78 118.11 inch)  Extended rod, 3 001 4 000 mm (118.15 157.48 inch)  Extended rod, 4 001 5 000 mm (157.52 196.85 inch)  Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator  Without thermal isolator  With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket  With 2 m (79 inch) of cable  With 5 m (197 inch) of cable  3
Extended rod, 3 001 4 000 mm (118.15 157.48 inch) Extended rod, 4 001 5 000 mm (157.52 196.85 inch) Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket With 2 m (79 inch) of cable With 5 m (197 inch) of cable 3
Extended rod, 4 001 5 000 mm (157.52 196.85 inch) Extended rod, 5 001 5 500 mm (196.89 216.53 inch)  Thermal isolator Without thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket With 2 m (79 inch) of cable With 5 m (197 inch) of cable 3
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]  Remote mount electronics and mounting bracket With 2 m (79 inch) of cable With 5 m (197 inch) of cable 3
mounting bracket With 2 m (79 inch) of cable With 5 m (197 inch) of cable 3
Wotted seels
wetted seals FKM FKM [for process temperatures above 1 -20 °C (-4 °F)]
Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body 1
Approvals Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6T4, ATEX II 2 D IP6X T100 °C
Dust Ignition Proof:
Intrinsically Safe: 1) CE, RCM, ATEX II 1 G EEx ia IIC T6T4, ATEX II 1/2 D IP6X T100 °C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C
Non-incendive:  CSA/FM Class I, Div. 2, Groups A, B, C, D  CSA/FM Class II, Div. 2, Groups F, G  CSA/FM Class III T4 or T6
Dust Ignition Proof with IS Probe:  CSA/FM Class II, Div. 1, Groups E, F, G  CSA/FM Class III T4  G  G
Intrinsically Safe: 1)  CSA/FM Class I, Div. 1, Groups A, B, C, D  CSA/FM Class II, Div. 1, Groups E, F, G  CSA/FM Class III T4
Explosion Proof with IS Probe:  CSA/FM Class I, Div. 1, Groups A, B, C, D  CSA/FM Class II, Div. 1, Groups E, F, G  CSA/FM Class III T4
General Purpose (CSA, FM)  General Purpose (CE, RCM)  K  L
Contract dipose (OE, Holy)

Point level measurement - RF Capacitance switches

#### Pointek CLS200 - Digital



- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ■. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000   ■	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Cable with		7ML5641-
Threaded or Flanged process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output.  CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.  Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel  3/4" NPT [(Taper), ANSI/ASME B1.20.1]  1" NPT [(Taper), ANSI/ASME B1.20.1]  11/4" NPT [(Taper), ANSI/ASME B1.20.1]  11/2" NPT [(Taper), ANSI/ASME B1.20.1]		0 B 0 C
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	1 B
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 D
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb	•	5 A 5 B 5 C
1½" ASME, 150 lb 1½" ASME, 300 lb 1½" ASME, 600 lb	•	5 D 5 E 5 F
2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb	•	5 G 5 H 5 J
3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb	•	
4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb	•	5 N 5 P 5 Q
Welded flange, 316L stainless steel,		
Type A flat faced  DN 25, PN 16	•	6 A
DN 25, PN 40 DN 40, PN 16	•	6 B 6 C
DN 40, PN 40 DN 50, PN 16 DN 50, PN 40	•	6 D 6 E 6 F
DN 80, PN 16 DN 80, PN 40 DN 100, PN 16 DN 100, PN 40	•	6 G 6 H 6 J 6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		

# Point level measurement - RF Capacitance switches

### Pointek CLS200 - Digital

Pointek CLS200 - Digital						
Selection and Ordering data		Arti	icle	No	٥.	
Pointek CLS200 - Digital - Cable with		7M	L56	641		
Threaded or Flanged process connection  Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output.  CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to	3	-		Ī	ľ	0
tune out build-up on the probe.  Probe length (length from flange face) (threaded lengths include process thread)				Н		
Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length	•		A			
can be determined by customer on assembly Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly	•		В			
Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 500 5 000 mm	•		С			
(19.69 196.85 inch)						
Extended cable, 5 001 10 000 mm (196.89 393.70 inch) Extended cable, 10 001 15 000 mm	•		D E			
(393.74 590.55 inch) Extended cable, 15 001 20 000 mm	•		F			
(590.59 787.40 inch) Extended cable, 20 001 25 000 mm (787.44 984.25 inch)	•		G			
Extended cable, 25 001 30 000 mm (984.29 1 181.10 inch)	•		Н			
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•		1			
Remote mount electronics and mounting bracket						
With 2 m (79 inch) of cable With 5 m (197 inch) of cable	•		2			
Wetted seals FKM and PTFE	•			0		
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	•			1		
Probe material FEP jacketed cable with PPS probe body FEP jacketed cable with PVDF probe body	•				0	
Approvals Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6T4, ATEX II 2 D IP6X T100 °C	•				В	
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	•				C	
Intrinsically Safe: 1) CE, RCM, ATEX II 1 G EEx ia IIC T6T4, ATEX II 1/2 D IP6X T100 °C	•				D	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•				E	
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	•				F	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				G	
Intrinsically Safe: 1) CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				Н	
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				J	
General Purpose (CSA, FM) General Purpose (CE, RCM)	•				L	

Selection and Ordering data	Article No.
Pointek CLS200 - Digital - Cable with	7ML5641-
Threaded or Flanged process connection	0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	
Enclosure and lid Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	A B C D

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000   ●	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

# Point level measurement - RF Capacitance switches

### Pointek CLS200 - Digital

Selection and Ordering data		Art				
Pointek CLS200 - Digital - Rod with Sanitary process connection				42-		_ ^
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		•			ľ	
Process connection Sanitary 316L stainless steel						
1" sanitary fitting clamp 1½" sanitary fitting clamp	•	8 A 8 B				
2" sanitary fitting clamp 21/2" sanitary fitting clamp 3" sanitary fitting clamp	•	8 C 8 D 8 E				
(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard.)						
Probe length (length from process connection face) Note: No Y01 needed in Order code for						
standard lengths	•					
Compact, 98 mm (3.86 inch) Extended rod, 250 mm (9.84 inch)	٠		A B			
Extended rod, 350 mm (13.78 inch)	•		С			
Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch)	•		D E			
Extended rod, 1 000 mm (39.37 inch)	٠		F			
Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch)	•		G H			
Extended rod, 1 500 mm (59.06 inch)	•		J			
Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	•		K L			
Add Order code Y01 and plain text: "Insertion length mm"						
Extended rod, 110 350 mm (4.3 13.78 inch)	•		M			
Extended rod, 351 1 000 mm (13.82 39.37 inch) Extended rod, 1 001 2 000 mm (39.41 78.74 inch)	•		N P			
Extended rod, 2 001 3 000 mm	•		Q			
(78.78 118.11 inch) Extended rod, 3 001 4 000 mm (118.15 157.48 inch)	•		R			
Extended rod, 4 001 5 000 mm (157.52 196.85 inch)	•		s			
Extended rod, 5 001 5 500 mm (196.89 216.53 inch)	•		T			
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•		0			
Remote mount electronics and mounting bracket						
With 2 m (79 inch) of cable With 5 m (197 inch) of cable	•		3			
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	•			0		
Probe material						
316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body	•				0	
Approvals Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6T4, ATEX II 2 D IP6X T100 °C	•				В	
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	•				С	
Intrinsically Safe: 1) CE, RCM, ATEX II 1 G EEx ia IIC T6T4, ATEX II 1/2 D IP6X T100 °C	•				D	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•				E	

Ξ				
	Selection and Ordering data		Article No.	
	Pointek CLS200 - Digital - Rod with Sanitary process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		7ML5642-	0
	Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	•	I	
	Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•	Ó	à
	Intrinsically Safe: 1) CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•	ł	4
	Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•	,	J
	General Purpose (CSA, FM)	•	ı	<
	General Purpose (CE, RCM)	•		
	Enclosure and lid Aluminum epoxy coated			
	2 x $\frac{1}{2}$ " NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x $\frac{1}{2}$ " NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	••••		A B C D
	1) Demine an Internal Laborator of the Code and the control of the code of the			

- <sup>1)</sup> Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

Point level measurement - RF Capacitance switches

### Pointek CLS200 - Digital

1 office of officer								
Selection and Ordering data		Arti	_	_		_		
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection		7M		-	-			_
Versatile inverse frequency shift capacitance level					ı	ı		U
and material detection switch with optional process	3							
connection choices and configurable output. CLS200 is ideal for detection of liquids, solids,								
slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	)							
✓ Click on the Article No. for the online configura-								
tion in the PIA Life Cycle Portal.								
Process connection Threaded, 316L stainless steel								
3/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 A						
1" NPT [(Taper), ANSI/ASME B1.20.1]		0 B						
11/4" NPT [(Taper), ANSI/ASME B1.20.1] 11/2" NPT [(Taper), ANSI/ASME B1.20.1]		0 D						
R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	_	1 A						
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1½" [(BSPT), EN 10226/PT (JIS-T),		1 B						
JIS B 0203]								
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 A						
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P),		3 B						
JIS B 0202] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P),		3 D						
JIS B 0202]		30						
Probe length (length from flange face)								
(threaded lengths include process thread)  Note: No Y01 needed in Order code for								
standard lengths								
Extended rod, 350 mm (13.78 inch)	•		c					
Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch)	•		D E					
Extended rod, 1 000 mm (39.37 inch)	•		F					
Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch)	•		G H					
Extended rod, 1 500 mm (59.06 inch)	•		J					
Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	•		K L					
Add Order code Y01 and plain text:	_		Ī					
"Insertion length mm"								
Extended rod, 350 1 000 mm (13.82 39.37 inch)			M					
Extended rod, 1 001 2 000 mm	•		N					
(39.41 78.74 inch) Extended rod, 2 001 3 000 mm	•		Р					
(78.78 118.11 inch)								
Extended rod, 3 001 4 000 mm (118.15 157.48 inch)			Q					
Extended rod, 4 001 5 000 mm	•		R					
(157.52 196.85 inch) Extended rod, 5 001 5 500 mm	•		s					
(196.89 216.53 inch)								
Thermal isolator Without thermal isolator	•			0				
With thermal isolator [for process connection	•			1				
temperatures over 85 °C (185 °F)]  Remote mount electronics and								
mounting bracket				_				
With 2 m (79 inch) of cable With 5 m (197 inch) of cable	•			2				
Wetted seals								
FKM and PTFE FFKM and PTFE for process temperatures above	•				0			
-20 °C (-4 °F)]								
Probe material 316L stainless steel with PPS probe body	•					0		
316L stainless steel with PVDF probe body	•					1		
Approvals Non-Sparking:	•						В	
CE, RCM, ATEX II 3 G Ex nA II T6T4,								
ATEX II 2 D IP6X T100 °C Dust Ignition Proof:	•						С	
CE, RČM, ATEX II 1/2 D T100 °C								
Intrinsically Safe: 1) CE, RCM, ATEX II 1 G EEx ia IIC T6T4,							D	
ATÉX II 1/2 D IP6X T100 °C								

Selection and Ordering data	Article No.	
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	7ML5643-	0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C		E
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6		F
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		G
Intrinsically Safe: 1) CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		Н
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		J
General Purpose (CSA, FM)		K
General Purpose (CE, RCM)		L
Enclosure and lid Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68		A B C D
4)		

- Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

Point level measurement - RF Capacitance switches

## Pointek CLS200 - Digital

Selection and Ordering data	Art	icle No.
Pointek CLS200 - Digital - PFA Rod with	7M	L5644-
PFA Flanged process connection		0
Versatile inverse frequency shift capacitance level and material detection switch with optional process		
connection choices and configurable output.		
CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to		
tune out build-up on the probe.		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Process connection		
Welded flange, PFA coated, 316L stainless steel,		
raised face		
1" ASME, 150 lb 1" ASME, 300 lb	5 A 5 B	
1" ASME, 600 lb	5 C	
1½" ASME, 150 lb	5 D	
1½" ASME, 300 lb 1½" ASME, 600 lb	5 E	
2" ASME, 150 lb	5 G	
2" ASME, 300 lb	5 H	
2" ASME, 600 lb	5 J	
3" ASME, 150 lb 3" ASME, 300 lb	5 K	
3" ASME, 600 lb	5 M	
4" ASME, 150 lb	5 N	
4" ASME, 300 lb 4" ASME, 600 lb	5 P	
Welded flange, PFA coated, 316L stainless steel,		
Type A flat faced		
DN 25, PN 16 DN 25, PN 40	6 A	
DN 40, PN 16	6 C	
DN 40, PN 40	6 D 6 E	
DN 50, PN 16 DN 50, PN 40	6 F	
DN 80, PN 16	6 G	
DN 80, PN 40 DN 100, PN 16	6 H	
DN 100, PN 40	6 K	
(Note: Flange bolting patterns and facings		
dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from process connection		
face)		
Note: No Y01 needed in Order code for standard lengths		
Compact, 98 mm (3.86 inch)		A
Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch)		B
		D
Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch)		E
Extended rod, 1 000 mm (39.37 inch)		F
Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch)		G H
Extended rod, 1 500 mm (59.06 inch)		J
Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)		K L
Add Order code Y01 and plain text:		
"Insertion length mm"		
Extended rod, 200 1 000 mm		М
(7.87 39.37 inch) Extended rod, 1 001 2 000 mm		N
(39.41 78.74 inch)		
Extended rod, 2 001 3 000 mm (78.78 118.11 inch)		P
Extended rod, 3 001 4 000 mm		Q
(118.15 157.48 inch)		
Extended rod, 4 001 5 000 mm (157.52 196.85 inch)		R
Extended rod, 5 001 5 500 mm		s
(196.89 216.53 inch)		
Thermal isolator Without thermal isolator		0
With thermal isolator [for process connection		i
temperatures over 85 °C (185 °F)]		

T Officer C	LOZOO - Digita
Selection and Ordering data	Article No.
Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection	7ML5644-
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	Ш
Remote mount electronics and mounting bracket	
With 2 m (79 inch) of cable With 5 m (197 inch) of cable	2 3
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0
Probe material PFA Coated 316L stainless steel with PPS probe	0
body PFA Coated 316L stainless steel with PVDF probe body	1
Approvals	
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	F
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
Intrinsically Safe: 1) CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	н
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
Enclosure and lid Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	A B C D
1) Barrier or Intrinsically Safe power supply required for I	ntrinsically Safe

Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

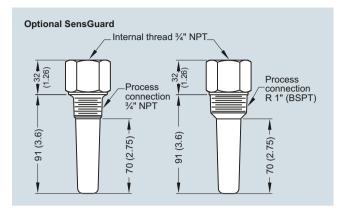
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions  Note: The Operating Instructions should be ordered as a separate line on the order.  This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/36
Accessories	See page 4/36

Point level measurement - RF Capacitance switches

# Pointek CLS200 – Standard and Digital

Pointek CL5200 – Standard and Digital	
Selection and Ordering data	Article No.
Operating Instructions - Standard	
English	7ML1998-5JH04
German	7ML1998-5JH34
Functional Safety manual, English	A5E35637149
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	A5E32221251
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	7ML1998-5JJ05
German	7ML1998-5JJ34
French	7ML1998-5JJ11
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	A5E32221496
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
SensGuard, $\frac{3}{4}$ " NPT (PPS) Only available for CLS200 with $\frac{3}{4}$ " NPT thread	7ML1830-1DL
SensGuard, R 1" (BSPT) (PPS) Only available for CLS200 with ¾" NPT thread	7ML1830-1DM
One metallic cable gland M20x1.5, -40 +80 °C (-40 +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 6 12 mm (0.236 0.472 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6,-40100 °C (-40212 °F), cable size 7 12 mm (0.275 0.472 inch)	7ML1830-1JC
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JD
Blind threaded flanges are available. Please contact ceg.smpi@siemens.com with a completed application data sheet on page 4/11	
Pointek Specials	See page 4/80

# Options

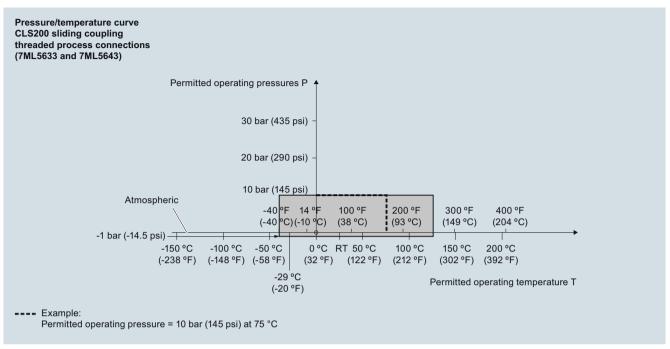


Optional SensGuard, dimensions in mm (inch)

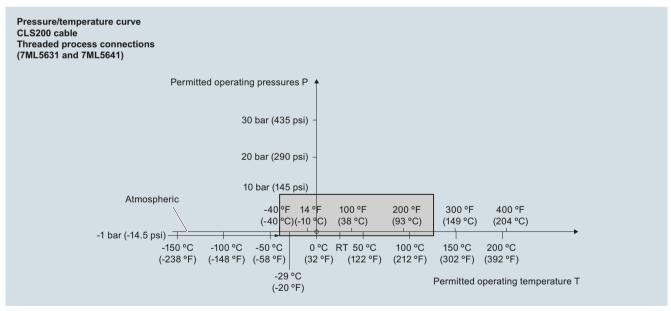
Point level measurement - RF Capacitance switches

Pointek CLS200 - Standard and Digital

## Characteristic curves



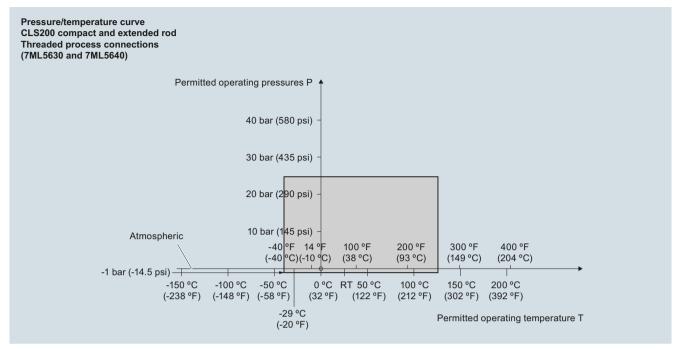
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5633 and 7ML5643)



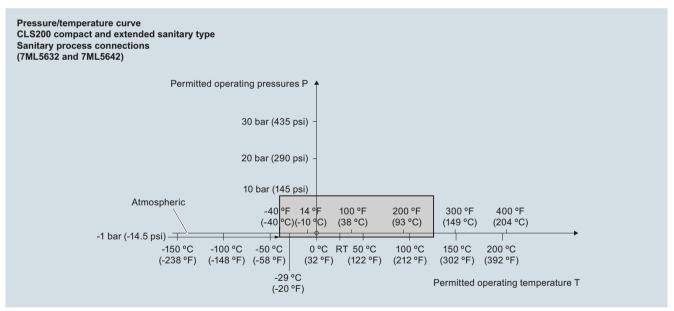
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

Point level measurement - RF Capacitance switches

### Pointek CLS200 - Standard and Digital



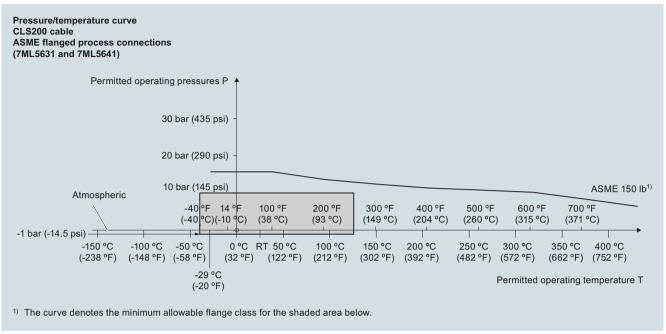
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 or 7ML5640)



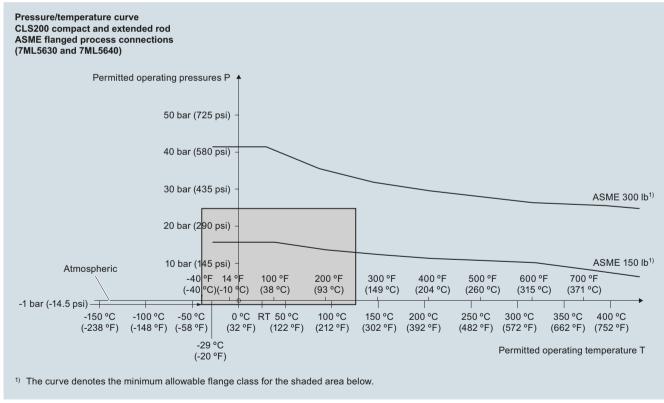
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)

Point level measurement - RF Capacitance switches

#### Pointek CLS200 - Standard and Digital



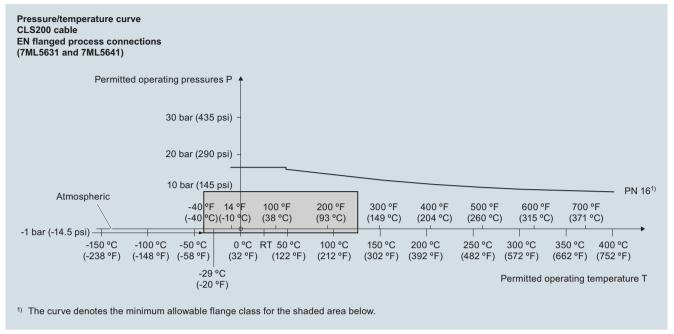
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)



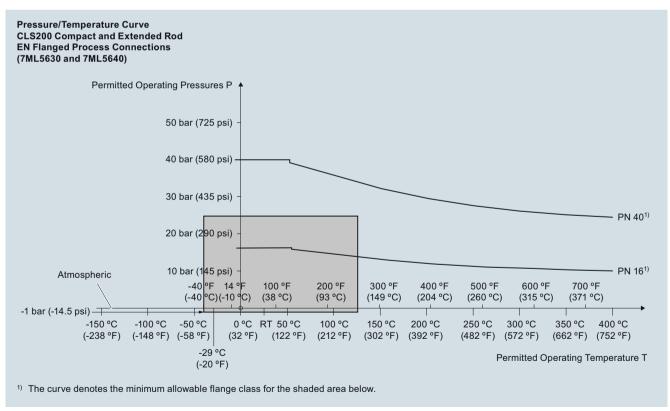
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

Point level measurement - RF Capacitance switches

#### Pointek CLS200 - Standard and Digital



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

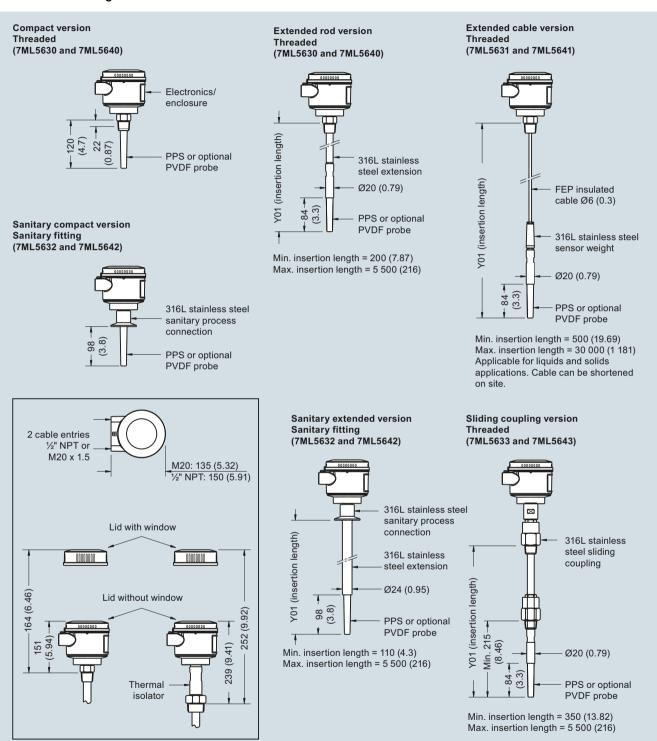


Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

Point level measurement - RF Capacitance switches

### Pointek CLS200 - Standard and Digital

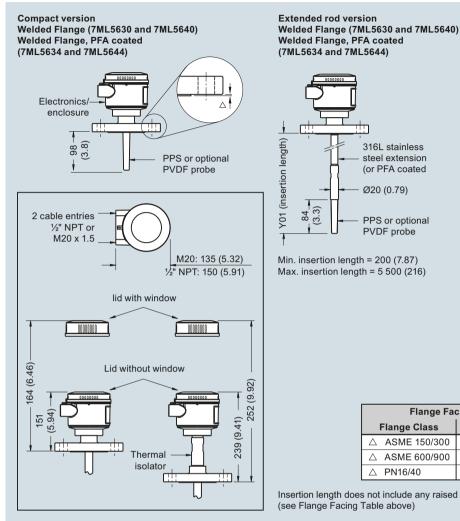
## Dimensional drawings



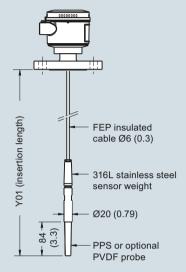
Pointek CLS200 - Threaded/sanitary process connections, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

### Pointek CLS200 - Standard and Digital



Extended cable version Welded Flange (7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69) Max. insertion length = 30 000 (1 181) Applicable for liquids and solids applications. Cable can be shortened on site.

Flange Facing (raised face)					
Flange Class Facing thickness					
△ ASME 150/300 2 (0.08)					
△ ASME 600/900	7 (0.28)				
△ PN16/40	2 (0.08)				

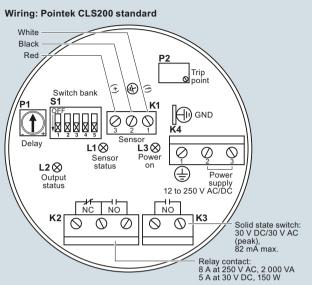
Insertion length does not include any raised face/gasket face dimension

Pointek CLS200 - Flanged Process Connections, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

Pointek CLS200 - Standard and Digital

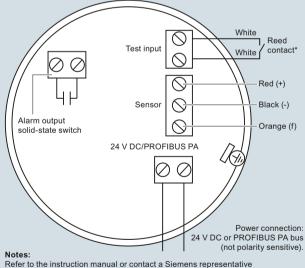
### Schematics



#### Notes:

- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

#### Wiring: Pointek CLS200 Digital



for detailed wiring information.

#### \*Magnet activated sensor Test

A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS200 connections

Point level measurement - RF Capacitance switches

#### Pointek CLS300 - Standard

#### Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.

#### Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status and power
- High-temperature version up to 400 °C (752 °F)

### Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

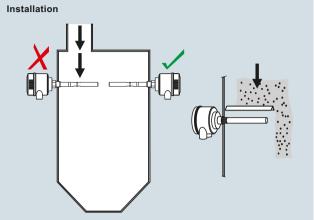
The fully potted electronics are unaffected by condensation, dust or vibration.

Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

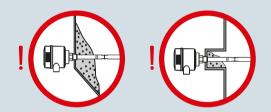
The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

 Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

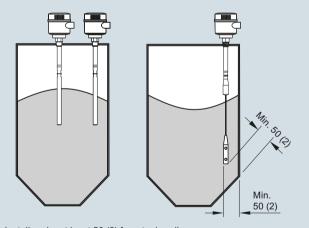
#### Configuration



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall. Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

# Point level measurement - RF Capacitance switches

## Pointek CLS300 - Standard

# Technical specifications

Mode of operation		Design
Measuring principle	Inverse frequency shift capacitive	Material (enclosure)
-	level detection	Degree of Protection
Input		
Measured variable	Change in picoFarad (pF)	Cable inlet
Output		
Output signal		Controls and displays
Relay output	1 SPDT Form C relay	Displays
- Max. contact voltage	• 30 V DC • 250 V AC	
- Max. contact current	• 5 A (DC) • 8 A (AC)	Potentiometers
- Max. switching capacity	<ul><li>150 W (DC)</li><li>2 000 VA (AC)</li></ul>	Switches
- Time delay (ON and/or OFF)	1 60 s	
Solid-state output		
- Output	Galvanically isolated	Power supply
- Protection	Against reversed polarity (bipolar)	Supply
- Max. switching voltage	<ul><li>30 V (DC)</li><li>30 V peak (AC)</li></ul>	55pp.y
- Max. load current	82 mA	Certificates and approvals
- Voltage drop	< 1 V, typical at 50 mA	General Purpose
- Time delay (pre or post switching)	1 60 s	Flameproof Enclosure with IS Pr
Accuracy		
Resolution		Dust Ignition Proof with IS Probe
<ul> <li>Min. sensitivity (pF)</li> </ul>	1 % change in actual capacitance	
Max. temperature error	0.2 % of actual capacitance value	
Rated operating conditions <sup>1)</sup>		Explosion Proof Enclosure with
Installation conditions		Probe
Location	Indoor/outdoor	
Ambient conditions		
Ambient temperature	-40 +85 °C (-40 +185 °F) <sup>2)</sup>	Marine
Medium conditions	Liquids, bulk solids, slurries and	
	interfaces, and applications with viscous materials	Overfill Protection
• Relative dielectric constant $\varepsilon_r$	Min. 1.5	
		Others
<ul> <li>Process temperature</li> </ul>		1) When operation is in areas cl
- Rod/Cable version	-40 +200 °C (-40 +392 °F) <sup>2)</sup>	according to relevant certific
- High-temperature version	-40 +400 °C (-40 +752 °F)	starting on page 4/58.
<ul> <li>Process pressure<sup>3)</sup></li> </ul>	-1 +35 bar g	2) Thermal isolator is used if pro
	(-14.6 +511 psi g)	(185 °F).

Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Controls and displays	
Displays	3 LEDs, for probe status, output status and power supply
Potentiometers	2 potentiometers for time delay and sensitivity
Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
Power supply	
Supply	12 250 V AC/DC, 0 60 Hz, galvanically isolated, 2 W
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6T1 ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100 °C CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Overfill Protection	WHG (Germany) VLAREM II (Belgium)
Others	Pattern Approval (China)
1) When eneration is in areas classific	d as hazardous, observe restrictions

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/58.
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).
- Pressure rating of process seal is temperature dependent. See Pressure/ Temperature curves starting on page 4/58.

Design: Probe			
	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO <sub>2</sub> <sup>1)</sup> ) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	Graphite <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

<sup>1)</sup> Zirconium Oxide

<sup>&</sup>lt;sup>2)</sup> For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings.

Point level measurement - RF Capacitance switches

### Pointek CLS300 - Standard

Salastian and Ordaring data		Λr+i	olo No
Selection and Ordering data  Pointek CLS300 - Standard - Rod Version			cle No. <b>L5650</b> -
with Threaded or Flanged process connection			L3030-
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.			
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.			
Process connection			
Threaded, 316L stainless steel  %" NPT [(Taper), ANSI/ASME B1.20.1]  1" NPT [(Taper), ANSI/ASME B1.20.1]  11/4" NPT [(Taper), ANSI/ASME B1.20.1]	• • •	0 A 0 B 0 C	
1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	• • •	0 D 1 A 1 B	
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	1 D	
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 A	
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 B	
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 D	
Welded flange, 316L stainless steel, raised face			
1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb	•	5 A 5 B 5 C	
1½" ASME, 150 lb 1½" ASME, 300 lb 1½" ASME, 600 lb	•	5 D 5 E 5 F	
2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb	•	5 G 5 H 5 J	
3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb	•	5 K 5 L 5 M	
4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb	•	5 N 5 P 5 Q	
Welded flange, 316L stainless steel,			
DN 25, PN 16	•	6 A	
DN 25, PN 40 DN 40, PN 16	•	6 B	
DN 40, PN 40 DN 50, PN 16	•	6 D	
DN 50, PN 40 DN 80, PN 16	•	6 F 6 G	
DN 80, PN 40 DN 100, PN 16	•	6 H 6 J	
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		6 K	
<b>Probe length</b> (length from flange face) (threaded lengths include process thread)			
Note: No Y01 needed in Order code for standard lengths			
Standard version, rod 350 mm (13.78 inch) Extended rod, length 500 mm (19.69 inch) Extended rod, length 750 mm (29.53 inch) Extended rod, length 1 000 mm (39.37 inch)	• • • •		A B C D

Selection and Ordering data		Artic	le	No	).		_
Pointek CLS300 - Standard - Rod Version		7ML					
with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.				-			
Add Order code Y01 and plain text:							П
"Insertion length mm"  Extended rod, factory adjusted length	•	E					
250 499 mm (9.8 19.65 inch)  Extended rod, factory adjusted length		F					
500 749 mm (19.69 29.49 inch) Extended rod, factory adjusted length 750 999 mm (29.53 39.3 inch)	•	ď					
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•		0				
Wetted seals FKM				0			
FFKM [for process temperatures above -20 °C (-4 °F)]	•			1			
Probe material 316L stainless steel with PFA lining and PEEK isolators	•				0		
Approvals							
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	•					С	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1, ATEX II 1/2 D T100 °C	•					D	
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1, ATEX II 1/2 D T100 °C	•					E	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•					F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•					G	
General Purpose (CSA, FM)	•					н	
General Purpose (CE, RCM)	•					J	
General Purpose with WHG approval (CSA, FM, CE, RCM)						K	
Enclosure and lid  Aluminum epoxy coated  2 x ½" NPT via adapter - cable inlet, IP65  2 x M20x1.5 cable inlet, IP65  2 x ½" NPT via adapter - cable inlet, IP68  2 x M20x1.5 cable inlet, IP68	•					A E C	3
Active shield length							
Standard length - (125 mm threaded, 105 mm flanged)	•						0
Extended shield -	•						1
(250 mm threaded, 230 mm flanged) <sup>1)</sup> Extended shield - (400 mm threaded, 380 mm flanged) <sup>2)</sup>	•						2

- $^{1)}$  Available with Probe version options B ... D, F, G only  $[\geq 500~\text{mm}~(19.69~\text{inch})]$
- Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

# Point level measurement - RF Capacitance switches

## Pointek CLS300 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurate output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.  I Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection Threaded, 316L stainless steel 1½' NPT [(Taper), ANSI/ASME B1.20.1] 1½' SB 0202]  Weided flange, 316L stainless steel, raised face 1½' ASME, 150 lb 1½' ASME, 500 lb 5E 1½' ASME, 600 lb 5E 1½' ASME, 600 lb 5E 1½' ASME, 600 lb 5T 13' ASME, 600 lb 5T 14' ASME, 600 lb 5T 15' ASME, 600 lb 5T 16' ASME, 600 lb 5T 17' ASME, 600 lb 5T 18' ASME,	Pointek C	LS	300	) - Si	and	lard
Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.  2 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Threaded, 316L stainless steel  11½* NPT ((Taper), ANSI/ASME B1.20.1)  1½* NPT ((Taper), ANSI/ASME B1.20.1)  INS B 0203  G 1½* (BSPT), EN 10226/PT (JIS-T), ID JIS B 0203  G 1½* (BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202  Welded flange, 316L stainless steel, raised face  1½* ASME, 150 lb  1½* ASME, 150 lb  2* ASME, 150 lb  2* ASME, 300 lb  3* ASME, 300 lb  3* ASME, 300 lb  3* ASME, 500 lb  4* ASME, 300 lb  3* ASME, 500 lb  4* ASME, 300 lb  5* ASME, 300 lb  4* ASME, 300 lb  5* ASME, 300 lb  5* ASME, 300 lb  4* ASME, 300 lb  5* ASME, 300 lb  6* CD  N 40, PN 40  DN 50, PN 40  DN 100, PN 40  No 100, PN 40  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 5000 1000 mm  (196.89 39.37 inch)  Extended cable, 6000 mm (236.22 inch), length can be shortened by customer  Extended cable, 6000 1000 mm  (196.89 39.37 inch)  Extended cable, 5001 1000 mm  (196.89 39.37 inch)  Extended cable, 5001 1000 mm  (196.89 39.37 inch)  Extended cable, 5001 1000 mm  (196.89 39.37 inch)  Extended cable, 20 001 25 000 mm  K	Selection and Ordering data		Arti	cle N	0.	
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.    Click on the Article No. for the online configuration in the PIA Life Cycle Portal.   Process connection	Pointek CLS300 - Standard - Cable Version		7MI	L5651	I	
### Process connection	Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has		••		ľ	
Threaded, 316L stainless steel   11/4" NPT [(Taper), ANSI/ASME B1.20.1]						
1½* NPT [(Taper), ANSI/ASME B1.20.1]						
S B 0 202	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	0 D 1 D			
11½* ASME, 150 lb 11½* ASME, 300 lb 11½* ASME, 300 lb 11½* ASME, 300 lb 2* ASME, 150 lb 2* ASME, 300 lb 3* ASME, 300 lb 3* ASME, 300 lb 3* ASME, 300 lb 3* ASME, 300 lb 4* ASME, 300 lb 4* ASME, 300 lb 5* M 4* ASME, 300 lb 5* M 4* ASME, 300 lb 5* M 4* ASME, 300 lb 5* N 4* ASME, 300 lb 5* N 4* ASME, 300 lb 5* N 5* N 5* N 5* N 5* N 6* N 6	JIS B 0202]	_				
2" ASME, 300 lb 2" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 150 lb 3" ASME, 600 lb 5 L 3" ASME, 600 lb 5 L 3" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 600 lb 5 P 5 P 5 P 4" ASME, 600 lb 5 P 5 P 5 P 4" ASME, 600 lb 5 P 5 P 5 P 5 P 5 P 6 P 6 P 6 P 6 P 6 P 6 P 6 P 6 P 6 P 6	1½" ASME, 150 lb 1½" ASME, 300 lb	•	5 E			
3* ASME, 300 lb 3* ASME, 600 lb 4* ASME, 150 lb 4* ASME, 300 lb 4* ASME, 300 lb 5P 4* ASME, 600 lb  Welded flange, 316L stainless steel, Type A flat faced  DN 40, PN 16 DN 40, PN 40 DN 50, PN 40 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 1 001 5 000 mm (333.74 590.55 inch) Extended cable, 20 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	2" ASME, 300 lb	•	5 H			
4" ASME, 300 lb 4" ASME, 600 lb  Welded flange, 316L stainless steel, Type A flat faced  DN 40, PN 16 DN 40, PN 40 DN 50, PN 40 DN 50, PN 40 DN 80, PN 16 DN 80, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 3 000 mm (236.22 inch), length can be shortened by customer Extended cable, 50 0 1 000 mm Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 500 1 10 000 mm (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	3" ASME, 300 lb 3" ASME, 600 lb	•	5 L 5 M			
Type A flat faced	4" ASME, 300 lb 4" ASME, 600 lb	•	5 P			
DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 5 001 5 000 mm (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	Welded flange, 316L stainless steel,  Type A flat faced					
DN 50, PN 40 DN 80, PN 16 DN 80, PN 40  DN 100, PN 16 DN 100, PN 40  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm  (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	DN 40, PN 40		6 D			
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 15 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	DN 50, PN 40 DN 80, PN 16	•	6 G			
(threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm  (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm  (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable	•				
standard lengths         Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer         Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer         Add Order code Y01 and plain text:         "Insertion length mm"         Extended cable, 500 1 000 mm         (19.69 39.37 inch)         Extended cable, 1 001 5 000 mm         (39.41 196.85 inch)         Extended cable, 5 001 10 000 mm         (196.89 393.70 inch)         Extended cable, 10 001 15 000 mm         (393.74 590.55 inch)         Extended cable, 15 001 20 000 mm         (590.59 787.40 inch)         Extended cable, 20 001 25 000 mm	(threaded lengths include process thread)					
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	standard lengths Extended cable, 3 000 mm (118.11 inch),	•		A		
"Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	Extended cable, 6 000 mm (236.22 inch),	•		В		
(19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	"Insertion length mm"					
(39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	(19.69 39.37 inch)					
(196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	(39.41 196.85 inch)	_				
(393.74 590.55 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	(196.89 393.70 inch)	_				
Extended cable, 20 001 25 000 mm <b>K</b>	(393.74 590.55 inch) Extended cable, 15 001 20 000 mm					
	Extended cable, 20 001 25 000 mm	•		K		

# Point level measurement - RF Capacitance switches

### Pointek CLS300 - Standard

Calcation and Ordaning data		Articl	ا ما	\lo		
Selection and Ordering data		Articl	_	_	<u> </u>	
Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection		7ML				
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.						
Thermal isolator						
Without thermal isolator			0			
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•		1			
Wetted seals						
FKM For process temperatures above				0 1		
-20 °C (-4 °F)]	_			'		
Probe material						
Bare 316L stainless steel cable, PEEK isolators and	d 🄷				0	
316L stainless steel cable weight						
PFA coated cable, PEEK isolators and 316L stainless steel cable weight	_				1	
Approvals						
Dust Ignition Proof with IS Probe:					С	
CE, RCM, ATEX II 1/2 D T100 °C					ľ	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1,	•				D	
ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe,	•				E	
with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1, ATEX II 1/2 D T100 °C						
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				G	
General Purpose (CSA, FM)	•				Н	
General Purpose (CE, RCM)	•				J	
General Purpose with WHG approval (CSA, FM, CE, RCM)	•				K	
Enclosure and lid						
Aluminum epoxy coated						
2 x ½" NPT via adapter - cable inlet, IP65	•					A
2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68	•					B C
2 x M20x1.5 cable inlet, IP68	•					D
Active shield length						
Standard length -	•					0
(125 mm threaded, 105 mm flanged) Extended shield -						1
(250 mm threaded, 230 mm flanged) <sup>1)</sup>	_					'
Extended shield -	•					2
(400 mm threaded, 380 mm flanged) <sup>1)</sup>						

 $<sup>^{1)}</sup>$  Available with Probe version options A, B, F ... K, only  $[\geq 1~000~\text{mm}~(39.7~\text{inch})]$ 

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length  in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Point level measurement - RF Capacitance switches

### Pointek CLS300 - Standard

Oalastian and Ondaring data		Λ 4		- N		
Selection and Ordering data  Pointek CLS300 - Standard - High Temperature		Arti				
Rod Version with Threaded or Flanged process		7 101				
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.						
✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  —						
Process connection Threaded, 316L stainless steel						
3/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 A				
1" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 B				
11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 C				
1½" NPT [(Taper), ANSI/ASME B1.20.1]	•					
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•					
R 1½" [(BSPT), EN 10226/PT (JIS-T),	•	1 D				
JIS B 0203] G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P),	•	3 A				
JIS B 0202]	•	3 B				
JIS B 0202] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P),	•	3 D				
JIS B 0202]						
Welded flange, 316L stainless steel, raised face						
1" ASME, 150 lb	•	5 A				
1" ASME, 300 lb 1" ASME, 600 lb		5 B 5 C				
1½" ASME, 150 lb	•	5 D				
1½" ASME, 300 lb	_	5 E				
1½" ASME, 600 lb		5 F				
2" ASME, 150 lb	•	5 G				
2" ASME, 300 lb 2" ASME, 600 lb		5 H 5 J				
3" ASME, 150 lb		5 K				
3" ASME, 300 lb	_	5 L				
3" ASME, 600 lb		5 M				
4" ASME, 150 lb	•	5 N				
4" ASME, 300 lb 4" ASME, 600 lb		5 P 5 Q				
Welded flange, 316L stainless steel,						
Type A flat faced						
DN 25, PN 16		6 A				
DN 25, PN 40 DN 40, PN 16	•	6 B				
DN 40, PN 40		6 D				
DN 50, PN 16	•	6 E				
DN 50, PN 40		6 F				
DN 80, PN 16 DN 80, PN 40		6 G 6 H				
DN 100, PN 16	•	6 J				
DN 100, PN 40		6 K				
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)						
Probe length (length from flange face) (threaded lengths include process thread)						
Note: No Y01 needed in Order code for standard lengths						
Standard version rod 350 mm (13.78 inch)	•		Α			
Extended rod, length 500 mm (19.69 inch)	•		В			
Extended rod, length 750 mm (29.53 inch) Extended rod, length 1 000 mm (39.37 inch)	•		C D			
Extended Iou, length 1 000 Hill (39.37 HICH)	_		U			

Selection and Ordering data		Arti	cle	No	).		
Pointek CLS300 - Standard - High Temperature		7M	L56	52	-		
Rod Version with Threaded or Flanged process connection			<b>0</b>	-			
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.							
Add Order code Y01 and plain text:							
"Insertion length mm"  Extended rod, factory adjusted length	•		E				
250 499 mm (9.8 19.65 inch) Extended rod, factory adjusted length			F				
500 749 mm (19.69 29.49 inch)			Г				
Extended rod, factory adjusted length 750 999 mm (29.53 39.3 inch)	•		G				
Wetted seals							
Graphite	•			0			
Probe material 316L stainless steel with ceramic (ZrO <sub>2</sub> ) isolators	•				0		
Approvals							
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	•				(	)	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1, ATEXII 1/2 D T100 °C	•						
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T1, ATEX II 1/2 D T100 °C	•				E		
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				F	=	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				(	3	
General Purpose (CSA, FM)	•				H	1	
General Purpose (CE, RCM)	•				١,	J	
General Purpose with WHG approval (CSA, FM, CE, RCM)	•				ł	(	
Enclosure and lid							
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	•					A	
2 x M20x1.5 cable inlet, IP65	•					В	
2 x ½" NPT via adapter - cable inlet, IP68	•					С	
2 x M20x1.5 cable inlet, IP68	•					D	
Active shield length Standard length -							0
(125 mm threaded, 105 mm flanged)	_						
Extended shield - (250 mm threaded, 230 mm flanged) <sup>1)</sup>	•						1
Extended shield -	•						2
(400 mm threaded, 380 mm flanged) <sup>2)</sup>							

- $^{1)}$  Available with Probe version options B ... D, F, G only  $[ \geq 500~\text{mm}~(19.69~\text{inch})]$
- Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Point level measurement - RF Capacitance switches

# Pointek CLS300 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Point level measurement - RF Capacitance switches

Pointek CLS300 - Digital

#### Overview



Pointek CLS300 (digital version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

#### Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- · Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

#### Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

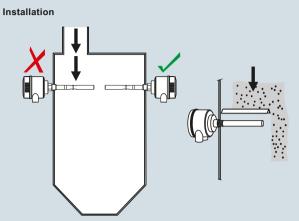
The fully potted electronics are unaffected by condensation, dust or vibration.

Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

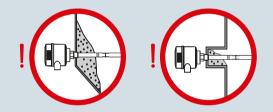
The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

 Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

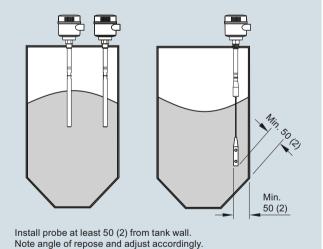
#### Configuration



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Pointek CLS300 installation, dimensions in mm (inch)

# Point level measurement - RF Capacitance switches

### Pointek CLS300 - Digital

### Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Solid-state output  Output Protection Max. switching voltage  Max. load current Voltage drop Time delay (pre or post switching)	Galvanically isolated Against reversed polarity (bipolar) • 30 V (DC) • 30 V peak (AC) 82 mA < 1 V, typical at 50 mA Programmable by user (0 100 s)
Fail-safe mode	Min. or max.
Connection	Removable terminal block
Accuracy Resolution • Min. sensitivity (pF) • Max. temperature error	1 % change in actual capacitance 0.2 % of actual capacitance value
Rated operating conditions <sup>1)</sup>	
Installation conditions	
Location	Indoor/outdoor
Ambient conditions • Ambient temperature	-40 +85 °C (-40 +185 °F) <sup>2)</sup>
Medium conditions $ \bullet \mbox{ Relative dielectric constant } \epsilon_r $	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials Min. 1.5
<ul> <li>Process temperature</li> <li>Rod/Cable version</li> <li>High Temperature version</li> <li>Process pressure<sup>3)</sup></li> </ul>	-40 +200 °C (-40 +392 °F) <sup>2)</sup> -40 +400 °C (-40 +752 °F) -1 +35 bar g (-14.6 +511 psi g)
Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Controls and displays	
Local display	LCD
Configuration	Locally, using 3 button keypad (for standalone operation)     Remotely, using SIMATIC PDM (for installation on a network)

Power supply	
Bus voltage (at process connection)	• Standard: 12 30 V DC • Intrinsically Safe: 12 24 V DC
Current consumption	12.5 mA
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
Flameproof Enclosure With IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6T4 ATEX II 1/2 D T100 °C
Dust Ignition Proof With IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Intrinsically Safe <sup>4)</sup>	ATEX II 1 G EEx ia IIC T6T4 ATEX II 1/2 D, 2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Others	Pattern Approval (China)
Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer:
	IEC 61158-2 MBP-(IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/58.
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- 3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/58.
- <sup>4)</sup> Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Design: Probe			
	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO <sub>2</sub> <sup>1)</sup> ) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	Graphite <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

<sup>1)</sup> Zirconium Oxide

<sup>&</sup>lt;sup>2)</sup> For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings

# Point level measurement - RF Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data		Δrti	cle No.
Pointek CLS300 - Digital - Rod with			L5660-
Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and inter-			
faces in demanding conditions where high pres- sure and temperatures are present and has the ability to tune out build-up on the probe.			
✓ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.			
Process connection Threaded, 316L stainless steel			
%" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 C	
1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	• • •	1 A 1 B	
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	1 D	
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P),	•	3 A 3 B	
JIS B 0202] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 D	
Welded flange, 316L stainless steel, raised face			
1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb	•	5 A 5 B 5 C	
1½" ASME, 150 lb 1½" ASME, 300 lb 1½" ASME, 600 lb	•	5 D 5 E 5 F	
2" ASME, 150 lb 2" ASME, 300 lb	•	5 G 5 H	
2" ASME, 600 lb 3" ASME, 150 lb	•	5 J 5 K	
3" ASME, 300 lb 3" ASME, 600 lb	_	5 L 5 M	
4" ASME, 150 lb	•	5 N	
4" ASME, 300 lb 4" ASME, 600 lb Welded flange, 316L stainless steel,		5 P 5 Q	
Type A flat faced		6 A	
DN 25, PN 16 DN 25, PN 40	•	6 A 6 B	
DN 40, PN 16 DN 40, PN 40		6 C 6 D	
DN 50, PN 16 DN 50, PN 40	•	6 E 6 F	
DN 80, PN 16 DN 80, PN 40	•	6 G 6 H	
DN 100, PN 16	•	6 J	
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		6 K	
Probe length (length from flange face)			
(threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths			
Standard version, rod 350 mm (13.78 inch) Extended rod, length 500 mm (19.69 inch) Extended rod, length 750 mm (29.53 inch) Extended rod, length 1 000 mm (39.37 inch)	• • • •		A B C D

Selection and Ordering data		Article	e No	Э.	
Pointek CLS300 - Digital - Rod with		7ML5	660	-	
Threaded or Flanged process connection					
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.					
Add Order code Y01 and plain text: "Insertion length mm"					
Extended rod, factory adjusted length 250 499 mm (9.8 19.65 inch)	•	E			
Extended rod, factory adjusted length 500 749 mm (19.69 29.49 inch)	•	F			
Extended rod, factory adjusted length 750 999 mm (29.53 39.3 inch)	•	G			
Thermal isolator Without thermal isolator	•		0		
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	•		1		
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F	•		0		
Probe material 316L stainless steel with PFA lining and PEEK isolators	•			0	
Approvals					
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C	•			В	
Intrinsically Safe <sup>1)</sup> CE, RCM, ATEX II 1 G EEx ia IIC T6T4, ATEX II 1/2 D, 2 D IP6X T100 °C	•			С	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•			D	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•			E	
Intrinsically Safe <sup>1)</sup> CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•			F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•			G	
General Purpose (CSA, FM)	•			Н	
General Purpose (CSA, FM, CE, RCM)	•			J	
p ( / - / -					

## Point level measurement - RF Capacitance switches

### Pointek CLS300 - Digital

Selection and Ordering data		Article No.	
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection		7ML5660-	
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.			
Enclosure and Lid Aluminum epoxy coated			
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	• • •		3
Active shield length Standard length -	•		0
(125 mm threaded, 105 mm flanged) Extended shield -	•		1
(250 mm threaded, 230 mm flanged) <sup>2)</sup> Extended shield - (400 mm threaded, 380 mm flanged) <sup>3)</sup>	•		2

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- 2) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]
- 3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length $\ensuremath{\bullet}$ in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000   ■	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.  7 Click on the Article No. for the online configuration in the PIAL Life Cycle Portal.  Process connection Process co	Selection and Ordering data	Article No.			
Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, surries, foam, and inter- faces in demanding conditions where high pres- sure and temperatures are present and has the ability to tune out build-up on the probe.  7 Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.  Process connection Threaded, 316L. stainless steel 1½" NPT [(Taper), ANSI/ASME B1.20.1] 1½" ASME, 150 Ib 1½" ASME, 150 Ib 1½" ASME, 300 Ib 1½" ASME, 600 Ib 2" ASME, 150 Ib 2" ASME, 600 Ib 3" ASME, 150 Ib 3" ASME, 600 Ib 3" ASME, 150 Ib 3" ASME, 150 Ib 3" ASME, 150 Ib 3" ASME, 300 Ib 4" ASME, 300 Ib 5" ASME, 300 Ib 5" ASME, 300 Ib 5" ASME, 600 Ib 4" ASME, 300 Ib 5" ASME, 600 Ib 4" ASME, 150 Ib 5" ASME, 600 Ib 5" ASME, 600 Ib 4" ASME, 150 Ib 6" ASME, 600 Ib 6" AND NO, PN 16 DN 40, PN 16 DN 50, PN 40 DN 9N 16 DN 50, PN 40 DN 100, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 10 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME 516.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Add Order code Y01 and plain text: Trisertion length mm" Extended cable, 5001 1000 mm (19.69 39.37 inch) Extended cable, 5001 1000 mm (39.41 196.85 inch) Extended cable, 1001 15 000 mm (39.37 59.05 5 inch) Extended cable, 10001 15 000 mm (39.39.37 inch) Extended cable, 10001 15 000 mm (39.59 787.40 inch) Extended cable, 10001 25 000 mm  K					
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.   I click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Process connection  Threaded, 316L stainless steel  1½* NPT [(Taper), ANSI/ASME B1.20.1]  1½* ASME, [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]  1D 31½* (BSPT), EN 10226/PT (JIS-T), JIS B 0203]  1D 31½* ASME, 500 ib  1½* ASME, 500 ib  2* ASME, 500 ib  2* ASME, 500 ib  3* ASME, 600 ib  3* ASME, 600 ib  3* ASME, 600 ib  3* ASME, 500 ib  4* ASME, 500 ib  5* ASME, 500 ib  5* ASME, 500 ib  4* ASME, 500 ib  5*					
### Process connection   Process connection   Threaded, 316L stainless steel     11/4" NPT ((Taper), ANSI/ASME B1.20.1]	material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the				
Threaded, 316L stainless steel   11/4" NPT. [(Taper), ANSI/ASME B1.20.1]	Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.				
11/4" NPT ((Taper), ANSI/ASME B1.20.1]       0 C         11/2" NPT ((Taper), ANSI/ASME B1.20.1]       0 D         R 11/2" ((BSPP), EN 10226/PT (JIS-T), JIS B 0203]       1 D         G 11/2" ((BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]       3 D         Welded flange, 316L stainless steel, raised face       11/2" ASME, 300 lb       5 D         11/2" ASME, 300 lb       5 E       5 D         11/2" ASME, 300 lb       5 F       5 E         2" ASME, 150 lb       5 G       5 H         2" ASME, 300 lb       5 H       5 J         3" ASME, 300 lb       5 L       5 K         3" ASME, 150 lb       5 K       3" ASME, 300 lb       5 L         3" ASME, 150 lb       5 M       5 M         4" ASME, 300 lb       5 L       5 N         4" ASME, 300 lb       5 L       5 N         4" ASME, 600 lb       5 N       5 N         4" ASME, 600 lb       5 N       5 N         4" ASME, 600 lb       5 N       5 N         4" ASME, 150 lb       5 N       5 N         4" ASME, 600 lb       5 N       5 N         DN 40, PN 16       6 C       6 C         DN 40, PN 16       6 C       6 E         DN 50, PN 40       6 H <td< td=""><td></td><td></td><td></td><td></td><td></td></td<>					
11/2" ASME, 150 lb       5 D         11/2" ASME, 300 lb       5 E         11/2" ASME, 600 lb       5 F         2" ASME, 150 lb       5 G         2" ASME, 300 lb       5 H         2" ASME, 600 lb       5 J         3" ASME, 150 lb       5 K         3" ASME, 300 lb       5 L         3" ASME, 600 lb       5 M         4" ASME, 150 lb       5 M         4" ASME, 300 lb       5 P         4" ASME, 600 lb       5 Q         Welded flange, 316L stainless steel,       1 Type A flat faced         DN 40, PN 16       6 C         DN 40, PN 16       6 E         DN 50, PN 40       6 F         DN 80, PN 16       6 G         DN 80, PN 40       6 F         DN 100, PN 16       6 G         Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)         Probe length (length from flange face) (threaded len	11/4" NPT [(Taper), ANSI/ASME B1.20.1] 11/2" NPT [(Taper), ANSI/ASME B1.20.1] R 11/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 11/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	0 D 1 D		
1½" ASME, 300 lb 1½" ASME, 600 lb 2" ASME, 500 lb 2" ASME, 300 lb 3" ASME, 300 lb 5 H 2" ASME, 500 lb 5 H 3" ASME, 500 lb 5 SM 4" ASME, 600 lb 5 SM 4" ASME, 500 lb 5 SM 4" ASME, 600 lb 5 SM 5 SM 6 C 6 C DN 50, PN 40 6 C DN 50, BN 6 C DN 50, PN 40 6 C DN 50,			5 D		
2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 300 lb 3" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 600 lb 5" ASME, 300 lb 3" ASME, 600 lb 5" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 300 lb 5" ASME, 300 lb 5" ASME, 300 lb 4" ASME, 300 lb 5" ASME, 600 lb 6" ASME, 600 l			5 E		
2" ASME, 300 lb 2" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 150 lb 3" ASME, 600 lb 5 SK 3" ASME, 600 lb 5 SM 4" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 300 lb 4" ASME, 300 lb 5 P 4" ASME, 600 lb 5 SM 4" ASME, 600 lb 5 SQ Welded flange, 316L stainless steel, Type A flat faced DN 40, PN 16 DN 40, PN 16 DN 50, PN 16 DN 50, PN 16 DN 80, PN 16 DN 80, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 500 1 000 mm (39.41 196.85 inch) Extended cable, 5 001 10 000 mm (196.89 39.37 inch) Extended cable, 1 001 5 000 mm (393.74 590.55 inch) Extended cable, 1001 15 000 mm (393.74 590.55 inch) Extended cable, 1001 20 000 mm (393.74 590.55 inch) Extended cable, 1001 20 000 mm (393.74 590.55 inch) Extended cable, 1001 20 000 mm (393.774 590.55 inch) Extended cable, 1001 20 000 mm (393.774 590.55 inch) Extended cable, 20 001 20 000 mm (393.774 590.55 inch) Extended cable, 1001 20 000 mm (393.774 590.55 inch) Extended cable, 20 001 20 000 mm					
3" ASME, 300 lb 3" ASME, 600 lb 4" ASME, 150 lb 4" ASME, 300 lb 5 P 4" ASME, 600 lb 5 P 4" ASME, 600 lb 5 P 4" ASME, 600 lb 5 Q Welded flange, 316L stainless steel, Type A flat faced DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 80, PN 16 DN 80, PN 16 DN 100, PN 40 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 500 1 000 mm (19.69 39.37 inch) Extended cable, 5 001 1000 mm (196.89 393.70 inch) Extended cable, 1001 5 000 mm (196.89 393.70 inch) Extended cable, 15 001 15 000 mm (196.89 393.70 inch) Extended cable, 15 001 20 000 mm (196.89 393.70 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm  K	2" ASME, 300 lb	•	5 H		
3* ASME, 600 lb  4* ASME, 150 lb  4* ASME, 300 lb  5 P  4* ASME, 600 lb  5 Q  Welded flange, 316L stainless steel, Type A flat faced  DN 40, PN 16  DN 40, PN 16  DN 50, PN 16  DN 50, PN 40  DN 80, PN 16  DN 100, PN 16  DN 100, PN 40  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm  (19.689 393.70 inch)  Extended cable, 10 001 5 000 mm  (196.89 393.70 inch)  Extended cable, 15 001 10 000 mm  (196.89 393.70 inch)  Extended cable, 15 001 20 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	3" ASME, 150 lb	•	5 K		
4" ASME, 300 lb 4" ASME, 600 lb  Welded flange, 316L stainless steel, Type A flat faced  DN 40, PN 16 DN 40, PN 16 DN 50, PN 16 DN 80, PN 16 DN 80, PN 16 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 1 001 5 000 mm (19.69 39.37 inch) Extended cable, 5 001 10 000 mm (196.89 393.70 inch) Extended cable, 10 001 15 000 mm (393.74 196.85 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm					
#* ASME, 600 lb  Welded flange, 316L stainless steel, Type A flat faced  DN 40, PN 16		•			
Type A flat faced  DN 40, PN 16  DN 40, PN 40  DN 50, PN 16  DN 50, PN 40  DN 80, PN 16  DN 80, PN 16  DN 100, PN 16  DN 100, PN 40  DN 100, PN 40  Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm  (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm					
DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 16 DN 100, PN 16 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 500 1 000 mm (19.69 39.37 inch) Extended cable, 5 001 10 000 mm (39.41 196.85 inch) Extended cable, 1 0 001 15 000 mm (393.74 590.55 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm					
DN 50, PN 16  DN 50, PN 40  DN 80, PN 16  DN 80, PN 16  DN 100, PN 16  DN 100, PN 16  DN 100, PN 40  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm  (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	DN 40, PN 16	•	6 C		
DN 50, PN 40 DN 80, PN 16 DN 80, PN 40  DN 100, PN 16 DN 100, PN 40  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 5 001 10 000 mm  (39.41 196.85 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm					
DN 80, PN 16 DN 80, PN 40  DN 100, PN 16 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text: "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm  (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm  (196.89 393.70 inch)  Extended cable, 15 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm		_			
DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text: "Insertion length mm" Extended cable, 500 1 000 mm (19.69 39.37 inch) Extended cable, 5 001 10 000 mm (39.41 196.85 inch) Extended cable, 10 001 15 000 mm (393.74 590.55 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm	DN 80, PN 16	•	6 G		
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 15 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm					
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  Insertion length mm  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm  (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm  (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm					
(threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm  (39.41 196.85 inch)  Extended cable, 500 10 000 mm  (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	(Note: Flange bolting patterns and facings dimensionally correspond to the applicable				
Note: No Y01 needed in Order code for standard lengths  Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer  Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm					
standard lengths         Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer         Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer         Add Order code Y01 and plain text:         "Insertion length mm"       "Extended cable, 500 1 000 mm         [19.69 39.37 inch)       Extended cable, 1 001 5 000 mm         [20.64					
length can be shortened by customer Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer  Add Order code Y01 and plain text:    Insertion length mm"	standard lengths				
length can be shortened by customer  Add Order code Y01 and plain text:  "Insertion length mm"  Extended cable, 500 1 000 mm  (19.69 39.37 inch)  Extended cable, 1 001 5 000 mm  (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm  (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm  (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm  (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm				A	
"Insertion length mm"         Extended cable, 500 1 000 mm         (19.69 39.37 inch)         Extended cable, 1 001 5 000 mm         (39.41 196.85 inch)         Extended cable, 5 001 10 000 mm         (196.89 393.70 inch)         Extended cable, 10 001 15 000 mm         (393.74 590.55 inch)         Extended cable, 15 001 20 000 mm         (590.59 787.40 inch)         Extended cable, 20 001 25 000 mm	Extended cable, 6 000 mm (236.22 inch),	•		В	
Extended cable, 500 1 000 mm (19.69 39.37 inch) Extended cable, 1 001 5 000 mm (39.41 196.85 inch) Extended cable, 5 001 10 000 mm (196.89 393.70 inch) Extended cable, 10 001 15 000 mm (393.74 590.55 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm					
Extended cable, 1 001 5 000 mm (39.41 196.85 inch)  Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm J (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm	Extended cable, 500 1 000 mm	•		E	
(39.41 196.85 inch) Extended cable, 5 001 10 000 mm (196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch) Extended cable, 15 001 20 000 mm (590.59 787.40 inch) Extended cable, 20 001 25 000 mm		•		F	
(196.89 393.70 inch)  Extended cable, 10 001 15 000 mm (393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	(39.41 196.85 inch)				
(393.74 590.55 inch)  Extended cable, 15 001 20 000 mm (590.59 787.40 inch)  Extended cable, 20 001 25 000 mm  K	(196.89 393.70 inch)				
(590.59 787.40 inch) Extended cable, 20 001 25 000 mm	(393.74 590.55 inch)				
Extended cable, 20 001 25 000 mm <b>K</b>				J	
	Extended cable, 20 001 25 000 mm	•		K	

## Point level measurement - RF Capacitance switches

### Pointek CLS300 - Digital

Selection and Ordering data		Article No. 7ML5661-				
Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection						
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.						
Thermal isolator						
Wallout allowal lookatol		1				
Wetted seals						
FKM FFKM [for process temperatures above -20 °C (-4 °F)]			0 1			
Probe material  Bare 316L stainless steel cable, PEEK isolators and				0		
316L stainless steel cable weight PFA coated cable, PEEK isolators and 316L stainless steel cable weight				1		
Approvals						
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C				E	3	
Intrinsically Safe <sup>1)</sup> CE, RCM, ATEX II 1 G EEx ia IIC T6 T4, ATEX II 1/2 D, 2 D IP6X T100 °C				(	3	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 T4, ATEX II 1/2 D T100 °C					)	
Intrinsically Safe <sup>1)</sup> CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4						
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4				(	à	
General Purpose (CSA, FM)				ŀ	1	
General Purpose (CSA, FM, CE, RCM)				١,	J	
Enclosure and Lid Aluminum epoxy coated	_					
0 4/INDT 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					Α	
E X WESX TO GASIO II IOU, II GO					В	
2 x /2 TVI T Via adaptor Gabio iniot, ii Go					C	
Active shield length	_					
Standard length -						0
(125 mm threaded, 105 mm flanged) Extended shield -						1
250 mm threaded, 230 mm flanged) <sup>2)</sup>						
Extended shield - (400 mm threaded, 380 mm flanged) <sup>2)</sup>						2

1)	Barrier or Int	rinsically	Safe power	supply	required for	r Intrinsically	Safe
	protection						

Available with Probe version options A, B and, F ... K only [≥ 1 000 mm (39.7 inch)]

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length  in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Point level measurement - RF Capacitance switches

### Pointek CLS300 - Digital

Selection and Ordering data		Δrti	cle N	Jo	
Pointek CLS300 - Digital - High Temperature			<b>.</b> 566		
Rod version with Threaded or Flanged proces connection	s				
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.	-				
Click on the Article No. for the online configur tion in the PIA Life Cycle Portal.	a-				
Process connection Threaded 216L steinless steel					
Threaded, 316L stainless steel  3/4" NPT [(Taper), ANSI/ASME B1.20.1]  1" NPT [(Taper), ANSI/ASME B1.20.1]  11/4" NPT [(Taper), ANSI/ASME B1.20.1]  11/2" NPT [(Taper), ANSI/ASME B1.20.1]	•	0 A 0 B 0 C			
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	•	1 A 1 B			
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P),	•	1 D			
JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 B			
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	•	3 D			
Welded flange, 316L stainless steel, raised face					
1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb	•	5 A 5 B 5 C			
1½" ASME, 150 lb 1½" ASME, 300 lb 1½" ASME, 600 lb	•	5 D 5 E 5 F			
2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb	•	5 G 5 H 5 J			
3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb	•	5 K 5 L 5 M			
4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb	•	5 N 5 P 5 Q			
Welded flange, 316L stainless steel,					
Type A flat faced DN 25, PN 16 DN 25, PN 40	•	6 A 6 B			
DN 40, PN 16	•	6 C			
DN 40, PN 40 DN 50, PN 16 DN 50, PN 40	•	6 D 6 E 6 F			
DN 80, PN 16	•	6 G			
DN 80, PN 40 DN 100, PN 16	•	6 H 6 J			
DN 100, PN 40	Ī	6 K			
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)					
Probe length (length from flange face) (threaded lengths include process thread)  Note: No Y01 needed in Order code for standard lengths					
Standard rengins Standard version, rod 350 mm (13.78 inch) Extended rod, length 500 mm (19.69 inch) Extended rod, length 750 mm (29.53 inch) Extended rod, length 1 000 mm (39.37 inch)	•		A B C D		

Selection and Ordering data		Articl	e N	0.		_
Pointek CLS300 - Digital - High Temperature		7ML5662-				
Rod version with Threaded or Flanged process connection			0	-		
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.						
Add Order code Y01 and plain text:						
"Insertion length mm"  Extended rod, factory adjusted length 250 499 mm (9.8 19.65 inch)	•	E				
Extended rod, factory adjusted length 500 749 mm (19.69 29.49 inch)	•	F				
Extended rod, factory adjusted length 750 999 mm (29.53 39.3 inch)	•	G				
Wetted seals Graphite	•		0			
Probe material	_		U			
316L stainless steel with ceramic (ZrO <sub>2</sub> ) isolators	•			0		
Approvals						
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C	•				В	
Intrinsically Safe <sup>1)</sup> CE, RCM, ATEX II 1 G EEx ia IIC T6T4, ATEX II 1/2 D, 2 D IP6X T100 °C	•				С	
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6T4, ATEX II 1/2 D T100 °C	•				D	
Intrinsically Safe <sup>1)</sup> CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	•				G	
General Purpose (CSA, FM)	•				Н	
General Purpose (CSA, FM, CE, RCM)	•				J	
Enclosure and Lid						
Aluminum epoxy coated					١.	
2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65	•				A	•
2 x ½" NPT via adapter - cable inlet, IP68					C	1
2 x M20x1.5 cable inlet, IP68					D	)
Active shield length						
Standard length - (125 mm threaded, 105 mm flanged)						0
Extended shield -	•					1
(250 mm threaded, 230 mm flanged) <sup>2)</sup> Extended shield -						2
(400 mm threaded, 380 mm flanged) <sup>3)</sup>	_					_

- <sup>1)</sup> Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection
- $^{2)}$  Available with Probe version options B ... D, F, G only  $[ \geq 500 \text{ mm} \ (19.69 \text{ inch})]$
- 3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

# Point level measurement - RF Capacitance switches

# Pointek CLS300 – Standard and Digital

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length • in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/57
Accessories	See page 4/57

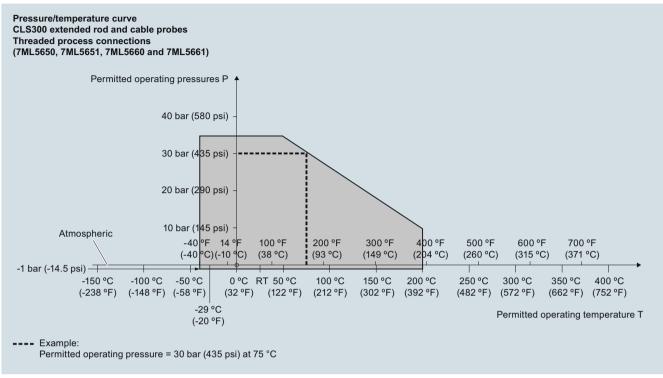
We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Operating Instructions - Standard	
English	7ML1998-5JH04
German	7ML1998-5JH34
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	A5E32221251
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	7ML1998-5JJ05
French	7ML1998-5JJ11
German	7ML1998-5JJ34
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	A5E32221496
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
One metallic cable gland M20x1.5, -40 +80 °C (-40 +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 6 12 mm (0.236 0.472 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 7 12 mm (0.275 0.472 inch)	7ML1830-1JC
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JD
Blind threaded flanges are available. Please contact ceg.smpi@siemens.com with a completed application data sheet on page 4/11	
Pointek Specials	See page 4/80

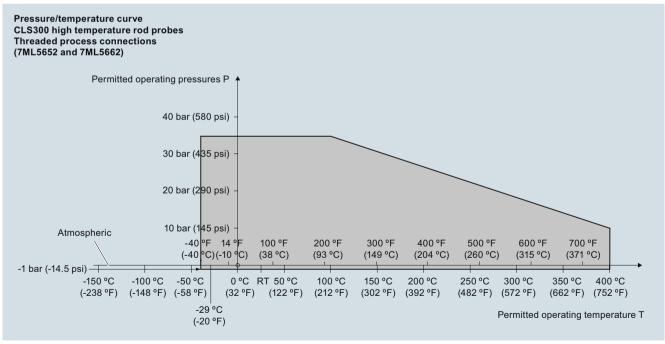
Point level measurement - RF Capacitance switches

#### Pointek CLS300 - Standard and Digital

#### Characteristic curves



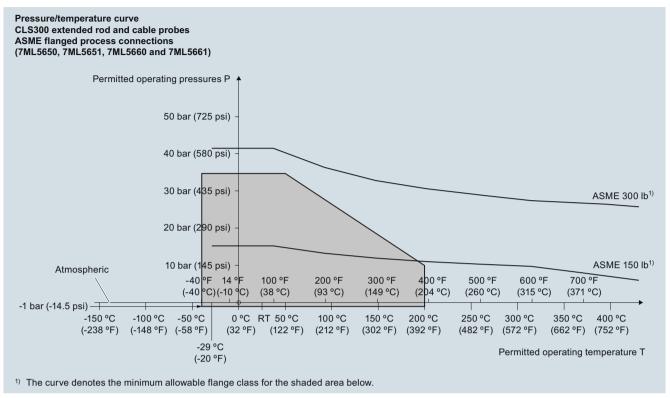
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)



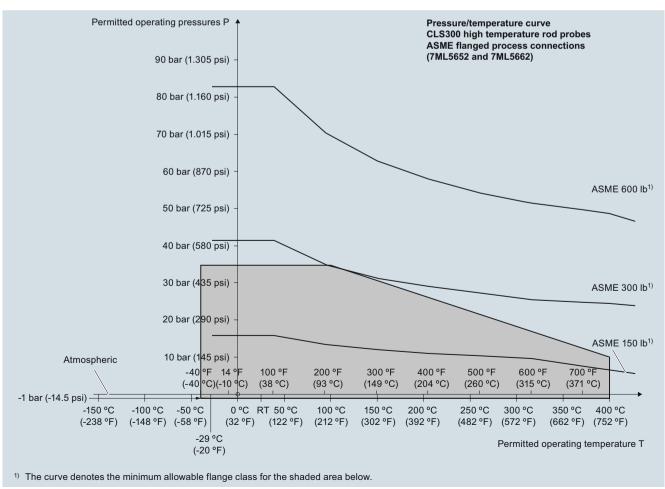
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

Point level measurement - RF Capacitance switches

#### Pointek CLS300 – Standard and Digital



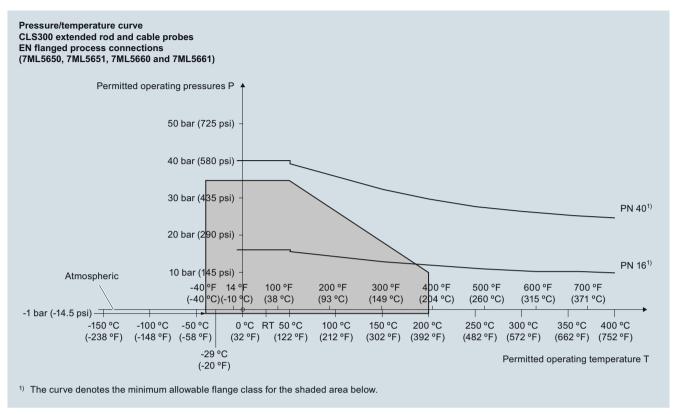
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)



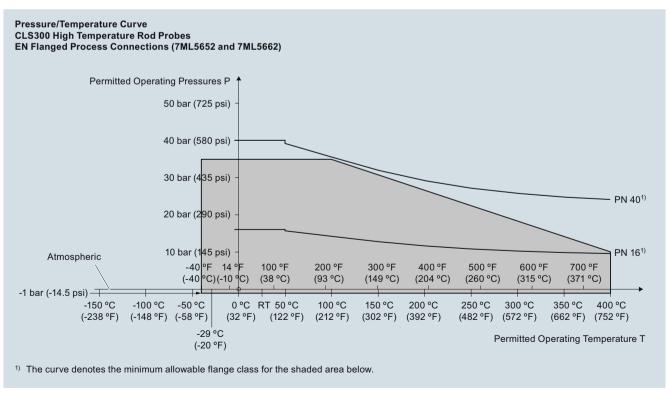
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

Point level measurement - RF Capacitance switches

#### Pointek CLS300 - Standard and Digital



Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

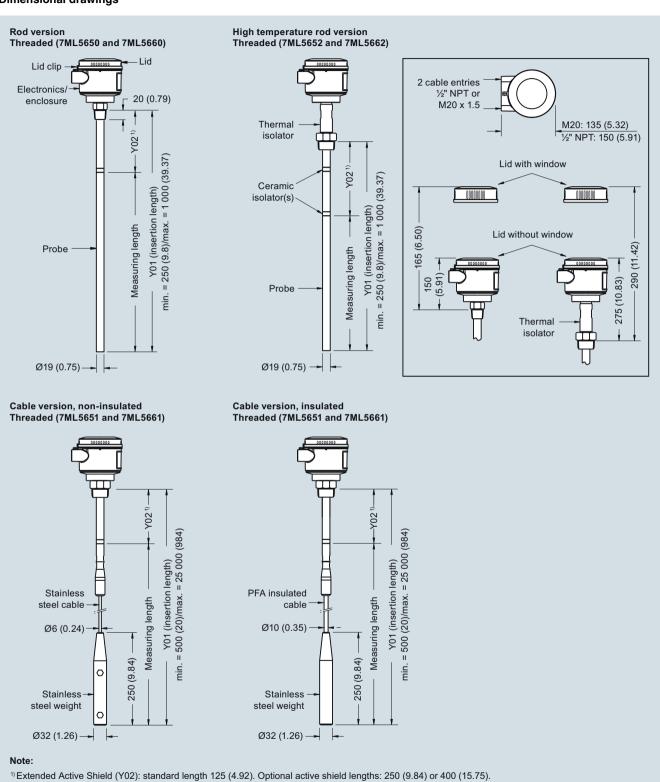


Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

Pointek CLS300 - Standard and Digital

### Point level measurement - RF Capacitance switches

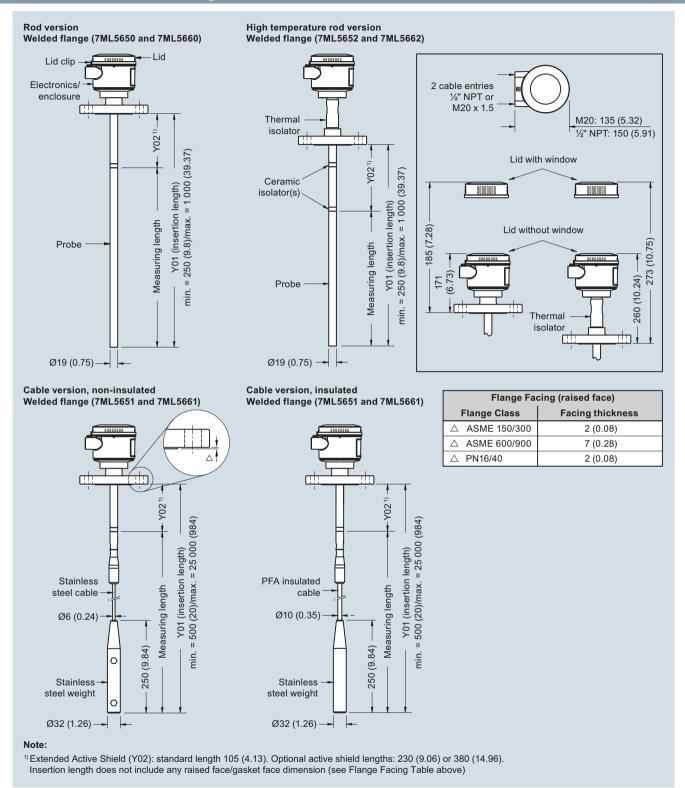
### Dimensional drawings



Pointek CLS300 - Threaded Process Connections, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

### Pointek CLS300 - Standard and Digital

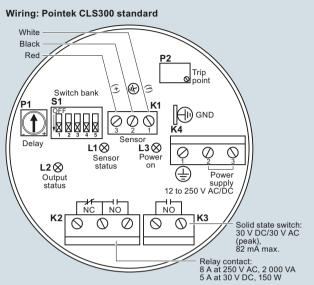


Pointek CLS300 - Flanged Process Connections, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

Pointek CLS300 - Standard and Digital

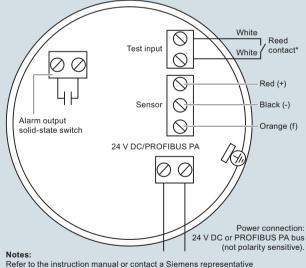
### Schematics



#### Notes:

- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

#### Wiring: Pointek CLS300 digital



for detailed wiring information.

#### \*Magnet activated sensor test

A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS300 connection

Point level measurement - RF Capacitance switches

#### Pointek CLS500

#### Overview



Pointek CLS500 is an inverse frequency shift capacitance level and material detection switch ideal for detecting interfaces, solids, liquids, toxic, and aggressive chemicals in critical conditions of high temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.

#### Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- 2-wire loop powered with solid-state switch or 4 to 20/20 to 4 mA output
- · Simple push-button calibration and integrated local display
- Full function diagnostics
- HART communications for remote commissioning and inspection

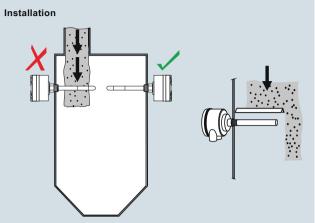
### Application

Active-Shield technology ensures that measurement is unaffected by vapors, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

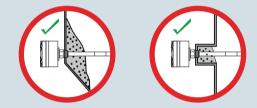
Pointek CLS500's microprocessor-based electronics provide one-point calibration, making setup possible without shutting down your production process.

Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

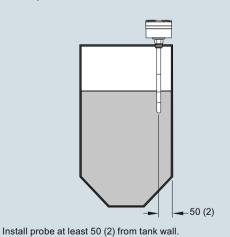
### Configuration



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Pointek CLS500 installation, dimensions in mm (inch)

### Point level measurement - RF Capacitance switches

Pointek CLS500

# Technical specifications

lament.	
Input	0.000 5
Measuring range	0 330 pF
Span	Min. 1 pF
Output	
Solid-state switch  Output  Protection  Max. switching voltage	Galvanically isolated Against reversed polarity (bipolar)  • 30 V (DC)  • 30 V peak (AC)
<ul><li>Max. load current</li><li>Voltage drop</li><li>Time delay (pre or post switching)</li></ul>	82 mA < 1 V, typical at 50 mA 1 60 s
Current loop	4 20 mA/20 4 mA
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typical < 0.1 %) of actual measurement value, whichever is greater over the full temperature range
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively
Accuracy	Deviation $< 0.1 \%$ of measured value
Rated operating conditions <sup>1)</sup>	
Installation conditions • Location	Indoor/outdoor
Ambient conditions  • Ambient temperature (transmitter)  • Installation category  • Pollution degree	-40 +85 °C (-40 +185 °F) <sup>2)</sup> I
$\begin{tabular}{ll} Medium conditions \\ \bullet \ Relative dielectric constant $\epsilon_r$ \\ \bullet \ Process temperature \end{tabular}$	Min. 1.5 Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 4/72.
Standard (PFA)     High temperature stainless steel version with thermal isolator     Cryogenic version	-50 +200 °C (-58 +392 °F) -60 +400 °C (-76 +752 °F) -200 +200 °C (-328 +392 °F) Contact ceg.smpi@siemens.com for
Process pressure	details.  Pressure rating of process seal is temperature dependent.  See Pressure/Temperature curves on page 4/72.
<ul><li>Standard (PFA)</li><li>High temperature version (Stainless</li></ul>	-1 +150 bar g (-14.6 +2 175 psi g) -1 +35 bar g
steel)	(-14.6 +507.6 psi g)

Design	
Material	
<ul> <li>Wetted parts material</li> </ul>	
- Standard rod	316L stainless steel
Probe isolation (rod)	PFA
Probe diameter	
Standard rod version (PFA)	16 mm (0.63 inch)
<ul> <li>High temperature rod version (Stainless steel)</li> </ul>	19 mm (0.75 inch)
,	
<ul><li>Probe length</li><li>Standard rod version (PFA)</li></ul>	Max. 1 000 mm (39.4 inch) with
- Staridard rod version (1777)	16 mm (0.63 inch) diameter probe
<ul> <li>High temperature rod version</li> </ul>	Max. measuring length 1 000 mm
(Stainless steel)	(39.4 inch) with 19 mm (0.75 inch) diameter probe
Dragge connection of probe	diameter probe
Process connection of probe     Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1]
Thiodaca moditing	R [(BSPT), EN 10226/PT (JIS-T),
	JIS B 0203]
	G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Flange mounting	ASME, EN 1092-1
Enclosure	
Material	Aluminum, epoxy-coated (Stainless
	steel option available.
• Cable inlet	Contact ceg.smpi@siemens.com) 2 x ½" NPT
<ul><li>Cable inlet</li><li>Degree of protection</li></ul>	Type 4X/NEMA4X/IP65, IP68
Power supply	Max. 33 V DC
	IVIAX. 33 V DO
Features	
Measurement current signaling	NAMUR NE 43
Measurement current signaling Safety	Inputs/outputs fully galvanically
	Inputs/outputs fully galvanically isolated
	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted
Safety	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier
	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier Primary variable (PV) out of limits,
Safety	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier     Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A con-
Safety	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and
Diagnostics with fault alarm when:	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
Safety	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and
<ul><li> Diagnostics with fault alarm when:</li><li> Function rotary switch</li></ul>	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier     Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility     Positions 0 9, A F
<ul><li> Diagnostics with fault alarm when:</li><li> Function rotary switch</li></ul>	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier     Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility     Positions 0 9, A F Conforming to HART Communication
<ul> <li>Diagnostics with fault alarm when:</li> <li>Function rotary switch</li> <li>SMART communication</li> </ul>	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier     Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility     Positions 0 9, A F Conforming to HART Communication
Diagnostics with fault alarm when:     Function rotary switch     SMART communication  Certificates and approvals General Purpose	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)
Diagnostics with fault alarm when:     Function rotary switch     SMART communication  Certificates and approvals	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4
Diagnostics with fault alarm when:     Function rotary switch     SMART communication  Certificates and approvals General Purpose	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C
Diagnostics with fault alarm when:     Function rotary switch     SMART communication  Certificates and approvals General Purpose	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1,
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking  Dust Ignition Proof	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1 T100 °C FM Class 1, Div. 1, Groups A, B, C, D
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking  Dust Ignition Proof	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1 T100 °C FM Class 1, Div. 1, Groups A, B, C, D T4
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking  Dust Ignition Proof	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1 T100 °C FM Class 1, Div. 1, Groups A, B, C, D
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking  Dust Ignition Proof	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1 T100 °C FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD EEx d [ia] IIC T6 T1 T100 °C Lloyds Register of Shipping,
Diagnostics with fault alarm when:     Function rotary switch     SMART communication      Certificates and approvals     General Purpose     Non incendive/Non sparking  Dust Ignition Proof  Explosion Proof	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility Positions 0 9, A F Conforming to HART Communication Foundation (HCF)  CE, CSA/FM, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 T4 T100 °C CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 T1 T100 °C FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD EEx d [ia] IIC T6 T1 T100 °C

When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
 See also Pressure/Temperature curves on page 4/72.

 $<sup>^{2)}</sup>$  Thermal isolator is used if process connection temperature exceeds 85  $^{\circ}\mathrm{C}$  (185  $^{\circ}\mathrm{F})$ 

Point level measurement - RF Capacitance switches

Pointek CLS500 probe version	Standard	HT Series
Process connection types	Standard (PFA) (7ML5601, 7ML5602, 7ML5603)	High Temperature (Stainless steel) (7ML5604)
Threaded	Available as standard	-
Flange	Available as standard	Available as standard
Process connection materials		
316L stainless steel	Available as standard	Available as standard
Probe insulation		
None	_	HT Stainless: available as standard
PFA	Available as standard	-
Length parameters		
Max. rod length	1 000 mm (40 inch)	1 000 mm (40 inch)
Process condtitions <sup>1)</sup>		
Max. process pressure	150 bar g (2 175 psi g)	Stainless steel: <sup>2)</sup> 35 bar g (507 psi g)
Max. process temperature	200 °C (392 °F)	400 °C (752 °F)

When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/72. Pressure rating of process seal is temperature dependent.

<sup>&</sup>lt;sup>2)</sup> Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.

<sup>-</sup> Not available as standard

# Point level measurement - RF Capacitance switches

Selection and Ordering data	Article No.
Pointek CLS500, threaded Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	7ML5601-
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronic transmitter	
No transmitter supplied	0
MSP 2002-1 (330 pF)	1
Process connection	
3½"	Α
7 <sup>4</sup> 1"	B
11/4"	C
1 74	C
1½"	D
2"	E
Threaded connection and rating NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T) JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	A B D
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	1
Approvals	
General Purpose: CE, CSA/FM, RCM	1
CSA/FM Class I, Div. 2, Groups A, B, C, D T4;	2
ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C;	
CSA/FM Class II and III Div. 1, Groups E, F, G T4	
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	4
FM Class I, Div. 1, Groups A, B, C, D T4	6
Probe/electrode diameter	_
16 mm (0.63 inch) rigid rod, minimum insertion length 200 mm (7.9 inch), maximum insertion length 1 000 mm (39.4 inch) <sup>1)</sup>	1
Thermal isolator/remote version	
Rigid thermal isolator [for process connection	A
temperature over 85 °C (185 °F)]	
No thermal isolator	В

1)	Add Order code Y01 and Y02 in plain text:
	"Insertion/active shield length to mm"

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Note: The difference between Y01 and Y02 must be a minimum of 150 mm	
Active Shield length - minimum length is 50 mm Y02: to mm <sup>1)</sup>	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/71
Pointek Specials	See page 4/80

<sup>1)</sup> See dimension drawings on page 4/77 for further explanation of Y02

# Point level measurement - RF Capacitance switches

Selection and Ordering data	Article No.
Pointek CLS500, welded flange	7ML5602-
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	- A 0
➢ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronic transmitter	
MSP 2002-1 (330 pF)	1
Welded flange, 316L stainless steel, raised face 2" ASME, 150 lb 2" ASME, 300 lb 3" ASME, 150 lb 3" ASME, 150 lb 10" ASME, 300 lb 10" ASME, 150 lb 11" ASME, 150 lb 12" ASME, 150 lb 13" ASME, 150 lb 14" ASME, 150 lb 15" ASME, 300 lb 10" ASME, 300 lb 10" ASME, 300 lb 10" ASME, 300 lb 11" ASME, 300 lb 10" ASME, 30	AAAABBABBCACBDADB
Probe insulation/material of process connection PFA insulation/316L stainless steel	1
Approvals General Purpose CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6
Probe/electrode diameter 16 mm (0.63 inch) rigid rod, min. length 200 mm (7.9 inch), max. length 1 000 mm (39.4 inch)	1
Thermal isolator Rigid thermal isolator [for process temperature over 85 °C (185 °F)] No thermal isolator	A B

<sup>1)</sup> Custom shipping methods required. Contact factory for more details.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Active Shield length - minimum length is 50 mm. Y02: to mm <sup>1)</sup>	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/71
Pointek Specials	See page 4/80

 $<sup>^{\</sup>rm 1)}$  See dimensional drawings on page 4/77 for further explanation of Y02

# Point level measurement - RF Capacitance switches

Selection and Ordering data	Article No.
Pointek CLS500, single piece flange	7ML5603-
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Electronic transmitter	
MSP 2002-1 (330 pF)	1
Process connection and pressure rating	
Single piece flange, 316L stainless steel,	
raised face 2" ASME, 150 lb	AA
2" ASME, 300 lb	AB
3" ASME, 150 lb	ВА
3" ASME, 300 lb <sup>1)</sup>	BB
4" ASME, 150 lb <sup>1)</sup>	CA
4" ASME, 300 lb <sup>1)</sup>	СВ
6" ASME, 150 lb 1)	DA
6" ASME, 300 lb <sup>1)</sup>	DB
Single piece flange, 316L stainless steel, Type B1 raised faced	
DN 50 PN 16	E C
DN 50 PN 16	ED
DN 80 PN 16	FC
DN 80 PN 25	F D
DN 100 PN 16 <sup>1)</sup>	GC
DN 100 PN 25 <sup>1)</sup>	G D
DN 125 PN 16 <sup>1)</sup>	H C
DN 125 PN 25 <sup>1)</sup>	H D
<b>Probe insulation/material of process connection</b> PFA insulation/316L stainless steel	1
Approvals	
General Purpose: CE, CSA/FM, RCM	1
CSA/FM Class I, Div. 2, Groups A, B, C, D T4;	2
ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	4
FM Class I, Div. 1, Groups A, B, C, D T4	6
Probe/electrode diameter	
16 mm (0.63 inch) rigid rod, maximum length 1 000 mm (39.4 inch) (Y01)	1
Thermal isolator	
Rigid thermal isolator [for process connection	
temperature over 85 °C (185 °F)]	

1)	Custom shipping	mathade	required	Contact	factory for	more details
٠,	Gusiom shidding	memous	reauirea.	Comaci	Tactory for	more details

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order	
code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Active Shield length - minimum length is 50 mm. Y02: to $\mbox{mm}^{1)}$	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	See page 4/71
Accessories	See page 4/80

 $<sup>^{\</sup>rm 1)}$  See dimensional drawings on page 4/77 for further explanation of Y02

Point level measurement - RF Capacitance switches

Selection and Ordering data	Art	icle No.
Pointek CLS500 High temperature	7M	L5604-
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	= A	
→ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Electronic transmitter MSP 2002-1 (330 pF)	1	
Process connection and pressure rating		
316L stainless steel, raised face <sup>1)</sup>		
2" ASME, 150 lb		A 1
2" ASME, 300 lb 2" ASME, 600 lb		A 2 A 3
2" ASME, 900 lb		A 4
3" ASME, 150 lb		B 1
3" ASME, 300 lb <sup>2)</sup>		B 2
3" ASME, 600 lb <sup>2)</sup>		B 3
3" ASME, 900 lb <sup>2)</sup>		B 4
4" ASME, 150 lb <sup>2)</sup>		C 1
4" ASME, 300 lb <sup>2)</sup> 4" ASME, 600 lb <sup>2)</sup>		C 2 C 3
4" ASME, 900 lb <sup>2)</sup>		C 4
6" ASME, 150 lb <sup>2)</sup>		D 1
6" ASME, 300 lb <sup>2)</sup>		D 2
6" ASME, 600 lb <sup>2)</sup>		D 3
6" ASME, 900 lb <sup>2)</sup> 316L stainless steel, Type B1 flat faced		D 4
DN 50 PN 16		E 1
DN 50 PN 25		E 2
DN 50 PN 40		E 3
DN 50 PN 63		E 4
DN 80 PN 16		F 1
DN 80 PN 25 DN 80 PN 40 <sup>2)</sup>		F 2 F 3
DN 80 PN 63 <sup>2)</sup>		F 4
DN 100 PN 16 <sup>2)</sup>		G 1
DN 100 PN 25 <sup>2)</sup>		G 2
DN 100 PN 40 <sup>2)</sup>		G 3
DN 100 PN 64 <sup>2)</sup>		G 4
DN 125 PN 16 <sup>2)</sup> DN 125 PN 25 <sup>2)</sup>		H 1
DN 125 PN 25 <sup>-7</sup> DN 125 PN 40 <sup>2)</sup>		H 2 H 3
DN 125 PN 64 <sup>2)</sup>		H 4
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		

Selection and Ordering data	Article No.
Pointek CLS500 High temperature	7ML5604-
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	A
Probe material of process connection	
No insulation/316L stainless steel <sup>3)4)</sup>	1
Stilling well No stilling well	0
Approvals	
General Purpose	A
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	В
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	D
FM Class I, Div. 1, Groups A, B, C, D T4	F
Probe/electrode diameter	
Maximum length 1 000 mm (39.37 inch) <sup>4)</sup>	A
Thermal isolator	
Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)]	1

- 1) Welded flange for no insulation option only
- <sup>2)</sup> Custom shipping methods required
- 3) Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75 inch)
- 4) Add Order code Y01 and Y02 in plain text:
  "Insertion/active shield length to mm"
  Minimum insertion length depends on probe version selected.
  See dimensional drawings on page 4/77 for more details.

Point level measurement - RF Capacitance switches

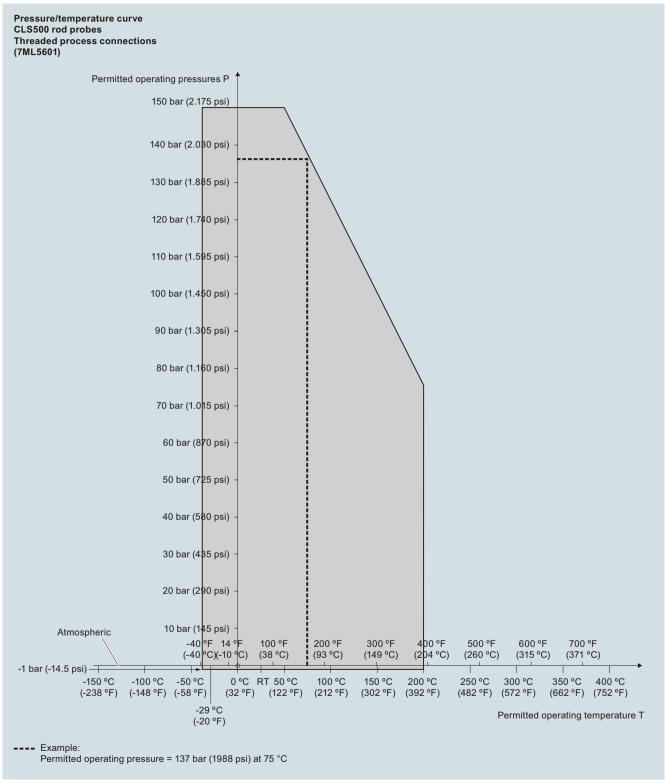
Selection and Ordering data	Order code
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Active Shield length - minimum length is 50 mm. Y02: to mm <sup>1)</sup>	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5GG03
German	7ML1998-5GG32
French	7ML1998-5GG11
Dutch Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5GG41
Quick Start manual, multi-language	A5E32243995
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 6 12 mm (0.236 0.472 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 7 12 mm (0.275 0.472 inch)	7ML1830-1JC
Transmitter, MSP 2002-1, 330 PF	7ML1830-1JP
Hazardous Locations	
1/2° NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JD
Pointek Specials	See page 4/80

 $<sup>^{\</sup>rm 1)}$  See dimensional drawings on page 4/77 for further explanation of Y02

Point level measurement - RF Capacitance switches

### Pointek CLS500

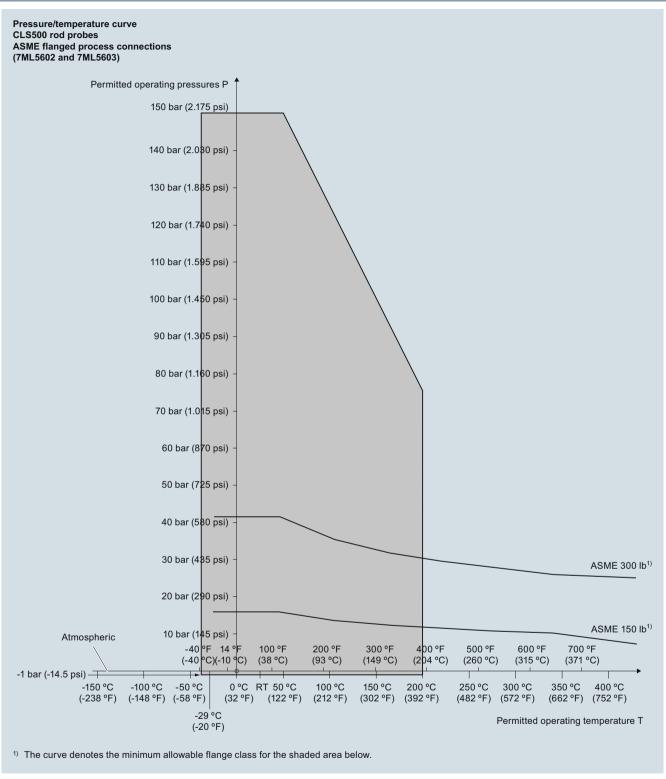
### Characteristic curves



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)

Point level measurement - RF Capacitance switches

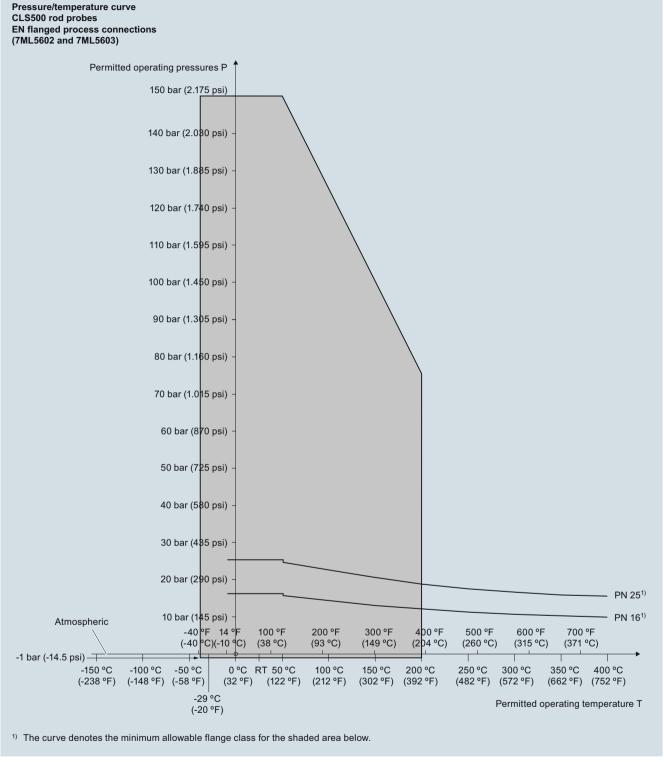
Pointek CLS500



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Point level measurement - RF Capacitance switches

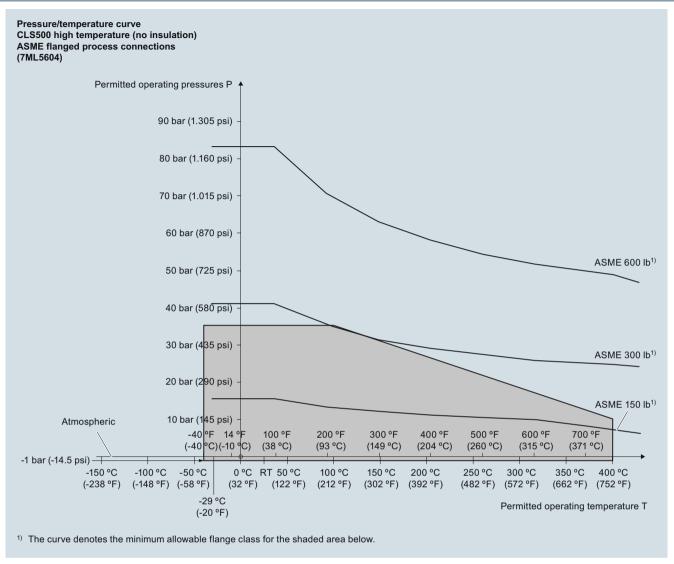
### Pointek CLS500



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Point level measurement - RF Capacitance switches

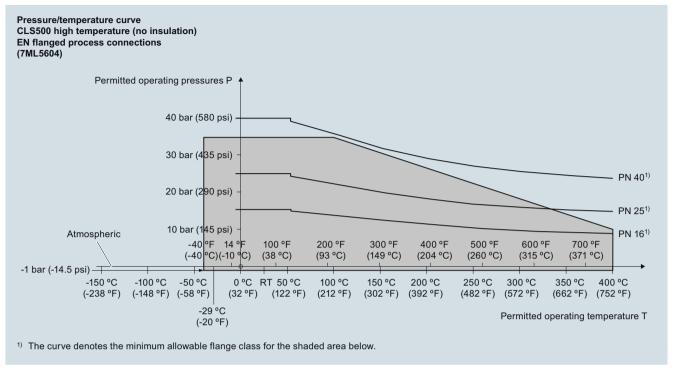
Pointek CLS500



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Point level measurement - RF Capacitance switches

### Pointek CLS500

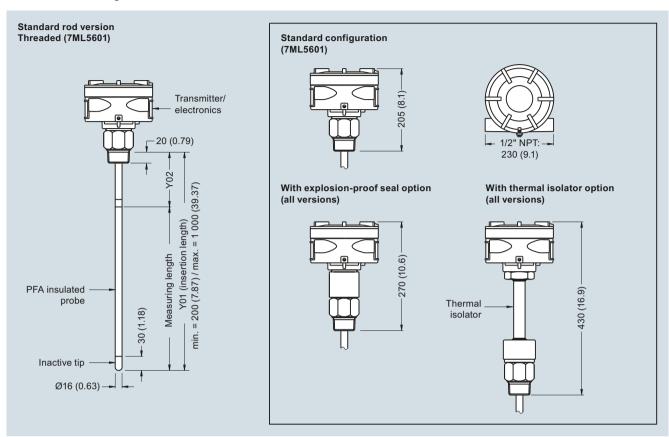


Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Point level measurement - RF Capacitance switches

Pointek CLS500

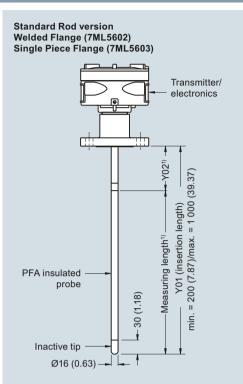
# Dimensional drawings

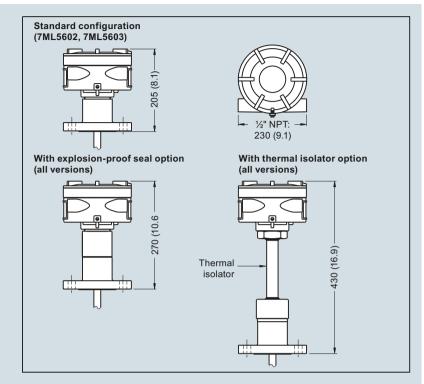


Pointek CLS500 - Threaded Process Connections, dimensions in mm (inch)

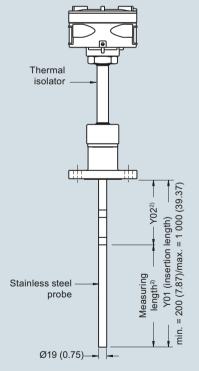
Point level measurement - RF Capacitance switches

### Pointek CLS500





High temperature rod version Welded Flange (7ML5604), Stainless steel rod4)



Flange Facing (raised face)						
Flange Class	Facing thickness					
△ ASME 150/300	2 (0.08)					
△ ASME 600/900	7 (0.28)					
△ PN16/25/40/64	2 (0.08)					

#### Notes:

- <sup>1)</sup> Min. Y02 (active shield length) = 50 (1.96) <sup>2)</sup> Min. Y02 (active shield length) = 105 (4.13)
- <sup>3)</sup>Min. Y02 (active shield length) = 100 (3.94)
- 4) Non conductive materials only

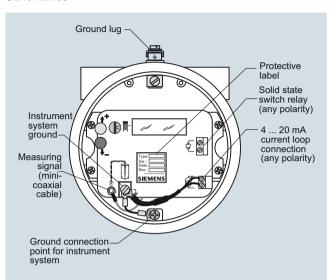
Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS500 - Flanged Process Connections, dimensions in mm (inch)

Point level measurement - RF Capacitance switches

Pointek CLS500

# Schematics



Pointek CLS500 connections

Point level measurement - RF Capacitance switches

# Pointek CLS Specials

Out of the second of the state of the			
Selection and ordering data		- · · · · · · · · · · · · · · · · · · ·	
Pointek Specials <sup>1)</sup>		Pointek Specials <sup>1)</sup>	
	Article No.		Article No.
CLS100 Polycarbonate Lid and Gasket, FKM		Kit, Sensor for cable units, PPS, Digital, FKM	A5E01163678
		Kit, Sensor for cable units, PPS, Standard, FFKM	A5E01163679
		Kit, Sensor for cable units, PPS, Digital, FFKM	A5E01163680
Kit, Lid and gasket, CLS100 enclosure version	A5E01163671	Kit, Sensor for cable units, PVDF, Standard, FKM	A5E01163681
CLS100 Miscellaneous Parts		. Kit, Sensor for cable units, PVDF, Digital, FKM	A5E01163682
		Kit, Sensor for cable units, PVDF, Standard,	A5E01163683
Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x <sup>2</sup> )		FFKM	
CLS200 Gasket (IP65), Synprene		Kit, Sensor for cable units, PVDF, Digital, FFKM	A5E01163684
Spare gasket, enclosure version (IP65 versions only)  CLS200 Gasket (IP68), Silicone	A5E01163672	CLS200 Mounting Bracket, 316L stainless steel	
CL3200 Gasket (IP66), Silicone			
		Spare mounting bracket	A5E01163685
Spare gasket, enclosure version (IP68 versions)	A5E01163673	CLS200 PROFIBUS Connector (IP65)	
CLS200 Blind Lid		Spare, PROFIBUS connector	A5E01163686
		(IP65 versions only)	
		CLS200 Miscellaneous Parts	
		CLS200 with FFKM O-rings (any version) <sup>2)</sup>	
		CLS200 Electronics	
		Test magnet, digital version	7ML1830-1JE
Spare aluminum blind lid	A5E01163674	Amplifier/power supply kit, standard version	A5E03251681
(for standard versions only)		Amplifier/power supply, digital version	7ML1830-1JF
CLS200 Lid with window		LCD display, digital version	7ML1830-1JK
Spare aluminum lid with window	A5E01163676	CLS300 Cable Extensions, 316L stainless steel	
CLS200 Sensor Kit for cable units	A3E01103070	Kit, stainless steel cable extension, 1 m,	A5E01163688
OLOZUU GERISUI KIL IUI CADIE UIIILS		adjustable by customer	
		Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
	1:2	Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, Sensor for cable units, PPS, Standard, FKM	A5E01163677	Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
		Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
		Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695

### Point level measurement - RF Capacitance switches

### Pointek CLS Specials

Pointek Specials <sup>1)</sup>		Pointek Specials <sup>1)</sup>	
Pointek Specials /	Article No.	Former Specials	Article No.
CI \$200 Cable Extensions	Article No.	CLS300 Electronics Kits with drivers	Afficie No.
CLS300 Cable Extensions, 316 stainless steel with PFA coating	#	(for rod or cable versions)  Kit, Electronics with driver, standard CLS300.	A5E01163723
	o	To be used in rod or cable versions with length less than 5 m. <sup>3)4)</sup>	A-F-04400705
Kit, PFA cable extension, 1 m, adjustable by customer	A5E01163697	Kit, Electronics with driver, digital CLS300.  To be used in rod or cable versions with length less than 5 m. <sup>3)4)</sup>	A5E01163725
Kit, PFA cable extension, 3 m, adjustable by customer	A5E01163698	CLS300 Electronics Kits with drivers	
Kit, PFA cable extension, 5 m, adjustable by customer	A5E01163699	(for cable versions)	
Kit, PFA cable extension, 10 m, adjustable by customer	A5E01163700		
Kit, PFA cable extension, 15 m, adjustable by customer	A5E01163701	Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. <sup>3)4)</sup>	A5E01163724
Kit, PFA cable extension, 20 m, adjustable by customer	A5E01163702	Kit, Electronics with driver, digital CLS300. To be used in cable versions with	A5E01163726
CLS300 Rod Kits, 316L stainless steel		length greater than 5 m. <sup>3)4)</sup>	
	4	CLS300 Electronics	
		Test magnet, digital version	7ML1830-1JE
		Amplifier/power supply kit, standard version	A5E03251683
	V	Amplifier/power supply, digital version	7ML1830-1JF
Vit stainless atop year 100 mass (7.00 in als) to	AFF01100710	LCD display, digital version	7ML1830-1JK
Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	A5E01163719	CLS300 Weight Kit, 316L stainless steel	
Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	A5E01163720		
Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation	A5E01163721	Kit, Spare stainless steel weight. To be used in any cable version of CLS300	A5E01163727
is 750 mm (29.53 inch).		CLS500 Gasket (IP65), Silicone	
Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	A5E01163722		
Kit, stainless steel rod 1 330 mm (52.36 inch) to be used with CLS300 units only (with standard		Spare gasket, CLS500 enclosure version, IP65	A5E01163728
active shield). Insertion length after installation is 1 500 mm (59.06 inch). <sup>2)</sup>		CLS500 Blind Lid	
Kit, stainless steel rod 1 830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation			
is 2 000 mm (78.74 inch). <sup>2)</sup>		Spare CLS500 aluminum blind lid	A5E01163729
Kit, stainless steel rod customized length up to 1 m <sup>2)</sup>		CLS500 Electronics Kit Transmitter, MSP 2002-1, 330 PF	7ML1830-1JP
Kit, stainless steel rod customized length		Special flange sizes and facings are available. Plants	
up to 2 m <sup>2)</sup>		ceg.smpi@siemens.com for part number and pric Questionnaire found on page 4/11.	ing. Submit Application

- Questionnaire found on page 4/11.
- <sup>2)</sup> Please contact ceg.smpi@siemens.com for part number and pricing.
- <sup>3)</sup> For General Purpose approvals only.
- 4) To maintain approvals, qualified trained Siemens personnel required for part replacement.

Please contact ceg.smpi@siemens.com for special requests.

Point level measurement - Vibrating switches

#### **SITRANS LVL100**

#### Overview



SITRANS LVL100 is a compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

#### Benefits

- · Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

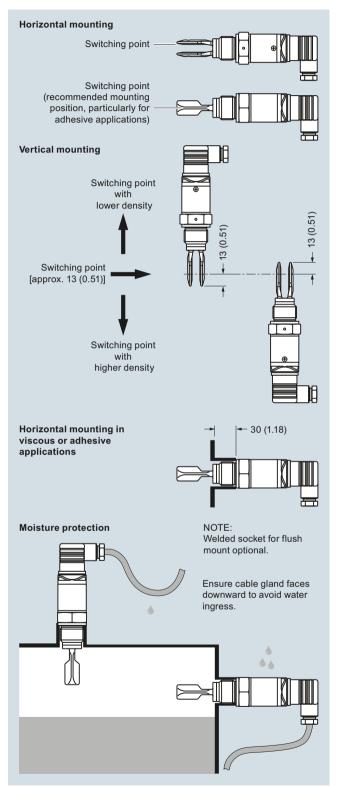
#### Application

SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used for material detection with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

 Key Applications: For use in liquids and slurries, for level measurement, overfill, and dry run protection

### Configuration



SITRANS LVL100 Installation, dimensions in mm (inch)

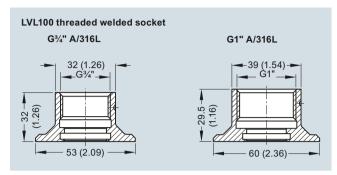
### Point level measurement - Vibrating switches

# SITRANS LVL100

# Technical specifications

Technical specifications	
Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand
Output	
Output options	<ul><li>Contactless electronic switch</li><li>Transistor output PNP</li></ul>
Measuring Accuracy	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 200 Hz
Rated operating conditions	
Installation conditions • Location	Indoor/outdoor
Ambient conditions  • Ambient temperature  • Installation category  • Pollution degree	-40 +70 °C (-40 +158 °F) III 2
Medium conditions  • Temperature  - Standard  - High temperature option  • Pressure (vessel)  • Density	-40 +100 °C (-40 +212 °F) -40 +150 °C (-40 +302 °F) -1 64 bar g (-14.5 928 psi g) 0.7 2.5 g/cm <sup>3</sup> (0.025 0.09 lb/in <sup>3</sup> )
Design	
Material	316L and Plastic PEI 316L (1.4404 or 1.4435) 316L (1.4404 or 1.4435) Klingersil C-4400
Process connection • Pipe thread, cylindrical	G ½" A, G ¾" A or G 1" A
(ISO 228 T1) • Pipe thread, tapered • Hygienic fittings	½" NPT, ¾" NPT or 1" NPT Bolting DN 40 PN 40 Tri-clamp 1", 1½", 2" PN 10
Degree of protection	IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector)
Conduit entry	1 x M12 [IP66/IP67 or IP68 (0.2 bar)]
Weight (housing)	250 g (9 oz)
Power supply	
Supply voltage	20 253 V AC, 50/60 Hz 20 253 V DC
Power consumption	Max. 0.5 W
Certificates and approvals	Overfill protection (WHG)     Shipping approvals

### Options



SITRANS LVL100 welded socket, dimensions in mm (inch)

### Point level measurement - Vibrating switches

### **SITRANS LVL100**

SITRANS LVL100 Compact vibrating level switch for use in liquid and sturry applications such as overflow, high, low, and demand applications, as well as pump protection. Ideal for use in confined spaces.    I Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Approvals  Without approvals  Shipping approvals  Without approvals  Without approvals  Shipping approvals  Without approvals  Shipping approvals  Shipping approvals  Process temperature  Standard -40 +150 °C (-40 +212 °F)²)  Extended -40 +150 °C (-40 +302 °F)²  Hygienic applications -40 +150 °C  (-40 +302 °F)³  Process connection  Thread G¾* A PN 64/316L  Thread G¾* A PN 64/316L Ra < 0.8 μm  Thread G¾* A PN 64/316L  Thread G¹* A PN 64/316L  Thread 1* NPT PN 64/316L  Thread 6* NPT (ASME B1.20.1) PN 64/316L  Thread G½* (DIN 3852-A) PN64 / 316L  Thread ½* NPT (ASME B1.20.1) PN 64/316L  Thread ½* NPT (ASME B1.20.1) P	Selection and Ordering data		Ar	ticle	N	0.		
Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. Ideal for use in confined spaces.   Z Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Approvals  Without approvals Without approvals Without approvals  Overfill protection (WHG)¹¹  Process temperature Standard -40 +100 °C (-40 +212 °F)²) Extended -40 +150 °C (-40 +302 °F)²)  Process connection Thread G¾* A PN 64/316L Thread G¹* NPT PN 64/316L Thread G¹* NPT PN 64/316L Thread G¹* NPT PN 64/316L Stread T¹* NPT PN 64/316L Thread G¹* NPT PN 64/316L Thread G¹* NPT PN 16 DIN 32676/316L Ra < 0.8 μm Tri-Clamp 1¹* PN 16 DIN 32676/316L Ra < 0.8 μm Tri-Clamp 1²* PN 16 DIN 32676/316L Ra < 0.8 μm Bolting DN25 PN 40 DIN 11851/316L Ra < 0.8 μm Bolting DN25 PN 40 DIN 11851/316L Ra < 0.8 μm Bolting DN40 PN 40 DIN 11851/316L Ra < 0.8 μm Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm SMS DN38 PN 6 316L Ra < 0.8 μm Thread G³* (DIN 3852-A) PN64 / 316L Thread ½*		_						
tion in the PIA Life Cycle Portal.  Approvals  Without approvals  Shipping approvals  Shipping approvals  Process temperature  Standard -40 +100 °C (-40 +212 °F)²)	slurry applications such as overflow, high, low, and demand applications, as well as pump protection.			-	Ī	Ì		A 0
Without approvals       1         Shipping approvals <sup>5</sup> )       2         Overfill protection (WHG)¹¹)       3         Process temperature       Standard -40 +100 °C (-40 +302 °F)²)       A         Extended -40 +150 °C (-40 +302 °F)²)       B         Hygienic applications -40 +150 °C (-40 +302 °F)³)       C         Process connection       A         Thread G¾* A PN 64/316L       A         Thread G¾* A PN 64/316L Ra < 0.8 μm								
Standard -40 +100 °C (-40 +212 °F)²)	Without approvals Shipping approvals <sup>5)</sup>	•	2					
Thread G¾" A PN 64/316L Thread G¾" A PN 64/316L Ra < 0.8 μm Thread ¾" NPT PN 64/316L Thread ¾" NPT PN 64/316L Thread ¾" NPT PN 64/316L Thread G1" A PN 64/316L Thread 1" NPT PN 16 DIN 32676/316L Thread 1" NPT PN 16 DIN 32676/316L Tri-Clamp 1½" PN 16 DIN 32676/316L Tri-Clamp 2 " PN 16 DIN 32676/316L Tri-Clamp 1 " A 4 5	Standard -40 +100 °C (-40 +212 °F) <sup>2)</sup> Extended -40 +150 °C (-40 +302 °F) <sup>2)</sup> Hygienic applications -40 +150 °C			В				
Thread G¾" A PN 64/316L Ra < 0.8 μm Thread ¾" NPT PN 64/316L Thread ¾" NPT PN 64/316L Ra < 0.8 μm Thread G1" A PN 64/316L Ra < 0.8 μm A 3 Thread G1" A PN 64/316L Ra < 0.8 μm Thread G1" A PN 64/316L Ra < 0.8 μm A 5 Thread 1" NPT PN 64/316L Ra < 0.8 μm Thread 1" NPT PN 64/316L Ra < 0.8 μm A 7 Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 μm Tri-Clamp 1"½" PN 16 DIN 32676/316L Ra < 0.8 μm Tri-Clamp 2 " PN 16 DIN 32676/316L Ra < 0.8 μm B 1 Bolting DN25 PN 40 DIN 11851/316L Ra < 0.8 μm B 2 Bolting DN40 PN 40 DIN 11851/316L Ra < 0.8 μm B 3 Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm B 4 SMS DN38 PN 6 316L Ra < 0.8 μm Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 μm Thread G½" (DIN 3852-A) PN64 / 316L Thread G½" (DIN 3852-A) PN64 / 316L Ra < 0.8 μm Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 μm  Electronics Contactless electronic switch 20 250 V AC/DC <sup>4)</sup> Transistor output PNP 10 55 V DC  Housing 316L  Electrical connection/Protection M12x1/IP67 According to DIN 43650 incl. plug with QuickOn connection/IP65		$\neg$						
Thread G1" A PN 64/316L Thread G1" A PN 64/316L Ra < 0.8 μm Thread 1" NPT PN 64/316L Thread 1" NPT PN 64/316L Ra < 0.8 μm A 5 Thread 1" NPT PN 64/316L Ra < 0.8 μm A 7 Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 μm Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 μm B0 tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 μm B0 tri-Clamp 2" PN 16 DIN 32676/316L Ra < 0.8 μm B0 tri-Clamp 2" PN 16 DIN 32676/316L Ra < 0.8 μm B0 tri-Clamp 2" PN 16 DIN 11851/316L Ra < 0.8 μm B0 tring DN25 PN 40 DIN 11851/316L Ra < 0.8 μm B0 tring DN30 PN 25 DIN 11851/316L Ra < 0.8 μm B3 B0 tring DN30 PN 25 DIN 11851/316L Ra < 0.8 μm B4 SMS DN38 PN 6 316L Ra < 0.8 μm B5 Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 μm Thread G½" (DIN 3852-A) PN64 / 316L Thread G½" (DIN 3852-A) PN64 / 316L Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 μm  Electronics Contactless electronic switch 20 250 V AC/DC4 Transistor output PNP 10 55 V DC  Housing 316L  Electrical connection/Protection M12x1/IP67 According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65	Thread G¾" A PN 64/316L Thread G¾" A PN 64/316L Ra < 0.8 $\mu$ m			A 1	ı			
Thread 1" NPT PN 64/316L Ra < 0.8 μm  Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 μm  Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 μm  Bolting DN25 PN 40 DIN 11851/316L Ra < 0.8 μm  Bolting DN40 PN 40 DIN 11851/316L Ra < 0.8 μm  Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  B 4  SMS DN38 PN 6 316L Ra < 0.8 μm  Hygienic fitting with compression nut F40  PN 25/316L Ra < 0.8 μm  Thread G½" (DIN 3852-A) PN64 / 316L  Thread G½" (DIN 3852-A) PN64 / 316L  Thread ½" NPT (ASME B1.20.1) PN 64/316L  Ra < 0.8 μm  Electronics  Contactless electronic switch 20 250 V AC/DC4)  Transistor output PNP 10 55 V DC  Housing  316L  Electrical connection/Protection  M12x1/IP67  According to DIN 43650 including plug/IP65  Acc. to DIN 43650 incl. plug with QuickOn connection/IP65	Thread G1" A PN 64/316L	•		A	ı			
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Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 μm  SMS DN38 PN 6 316L Ra < 0.8 μm  Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 μm  Thread G½" (DIN 3852-A) PN64 / 316L Thread G½" (DIN 3852-A) PN64 / 316L Ra < 0.8 μm  Thread ½" NPT (ASME B1.20.1) PN 64/316L Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 μm  Electronics Contactless electronic switch 20 250 V AC/DC⁴) □ Transistor output PNP 10 55 V DC  Housing 316L  Electrical connection/Protection  M12x1/IP67 According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65	Tri-Clamp 2 " PN 16 DIN 32676/316L Ra < 0.8 μm			В	ı			
PN 25/316L Ra < 0.8 μm  Thread G/½" (DIN 3852-A) PN64 / 316L  Thread G/½" (DIN 3852-A) PN64 / 316L Ra < 0.8 μm  C1  Thread ½" NPT (ASME B1.20.1) PN 64/316L  Ra < 0.8 μm  Electronics  Contactless electronic switch 20 250 V AC/DC <sup>4)</sup> Transistor output PNP 10 55 V DC  Housing  316L  Electrical connection/Protection  M12x1/IP67  According to DIN 43650 including plug/IP65  Acc. to DIN 43650 incl. plug with QuickOn connection/IP65	Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 µm			В	ı			
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Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 μm  Electronics  Contactless electronic switch 20 250 V AC/DC⁴) □ 1  Transistor output PNP 10 55 V DC □ 2  Housing 316L □ 1  Electrical connection/Protection  M12x1/IP67 □ A  According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65  C 3  A  C 3  B  C 3  C 3  C 3								
Contactless electronic switch 20 250 V AC/DC <sup>4)</sup> 1 Transistor output PNP 10 55 V DC  Housing 316L  Electrical connection/Protection M12x1/IP67 According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65  C	Thread 1/2" NPT (ASME B1.20.1) PN 64/316L				1 1			
316L 1  Electrical connection/Protection  M12x1/IP67 A According to DIN 43650 including plug/IP65 B Acc. to DIN 43650 incl. plug with QuickOn connection/IP65  C	Contactless electronic switch 20 250 V AC/DC <sup>4)</sup>							
M12x1/IP67 A According to DIN 43650 including plug/IP65 B Acc. to DIN 43650 incl. plug with QuickOn connection/IP65 C	•	•				1		
According to DIN 43650 including plug/IP65  Acc. to DIN 43650 incl. plug with QuickOn connection/IP65  B C							,	
M12x1 incl. 5 m cable/IP68 (0.2 bar)	According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn						В	
	M12x1 incl. 5 m cable/IP68 (0.2 bar)						D	

- 1) Available with process connection A0, A2, A4, and A6 only
- 2) Available with process connection A1, A3, A5, and A7 ... B6 only
- $^{\rm 3)}$  Available with Electrical connection/Protection option B and C only
- 4) Available with Process Temperature option A only
- 5) Available with Process Temperature option A only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

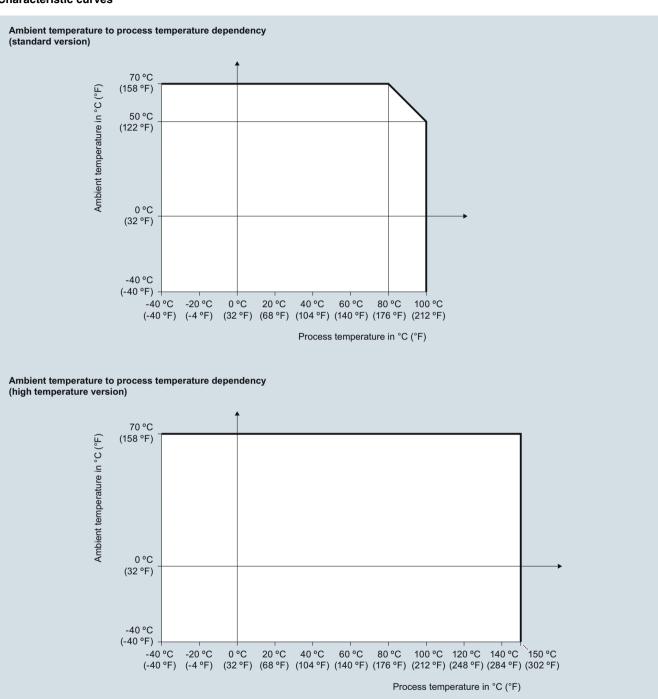
Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Article No. and specify Order code(s).		
Cleaning including certificate (oil, grease and silicone free)		W01
Identification Label, foil laser marking	•	Y16
Acceptance test certificate 3.1 for instrument	•	C12
Acceptance test Certificate 2.2 for material EN10204	•	C15
3.1-Inspection Certificate for instrument with test data (EN 10204)		C25
Additional Operating Instructions		Article No.
LVL100 (Contactless electronic switch)		
• English		7ML1998-5KN0
• French		7ML1998-5KN1
• Spanish		7ML1998-5KN2
German		7ML1998-5KN3
LVL100 (Transistor PNP)		
• English		7ML1998-5KP0
• French		7ML1998-5KP1
Spanish		7ML1998-5KP2
German     This device is shipped with the Siemens     Milltronics manual DVD containing the Operating     Instructions library.	9	7ML1998-5KP3
Spare Parts LVL100 Threaded Welded Socket		
G¾" A/316L with FKM Seal		7ML1930-1EE
G1" A/316L with FKM Seal		7ML1930-1EF
M27x1.5/316L with FKM Seal		7ML1930-1EG
G¾" A/316L with EPDM Seal		7ML1930-1EH
G1" A/316L with EPDM Seal		7ML1930-1EJ
M27x1.5/316L with EPDM Seal		7ML1930-1EK

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Point level measurement - Vibrating switches

**SITRANS LVL100** 

### Characteristic curves

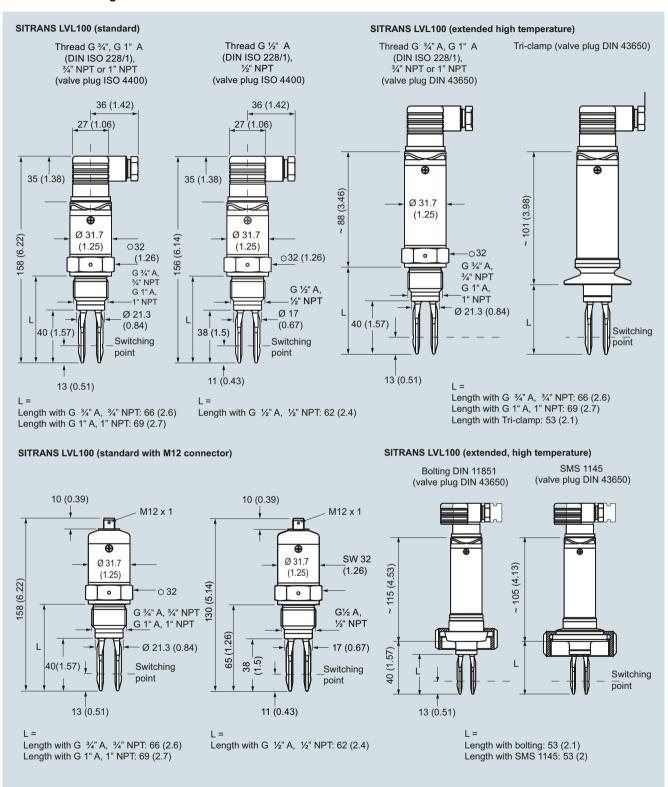


SITRANS LVL100 Ambient Temperature/Process Temperature derating curves

Point level measurement - Vibrating switches

#### **SITRANS LVL100**

#### Dimensional drawings

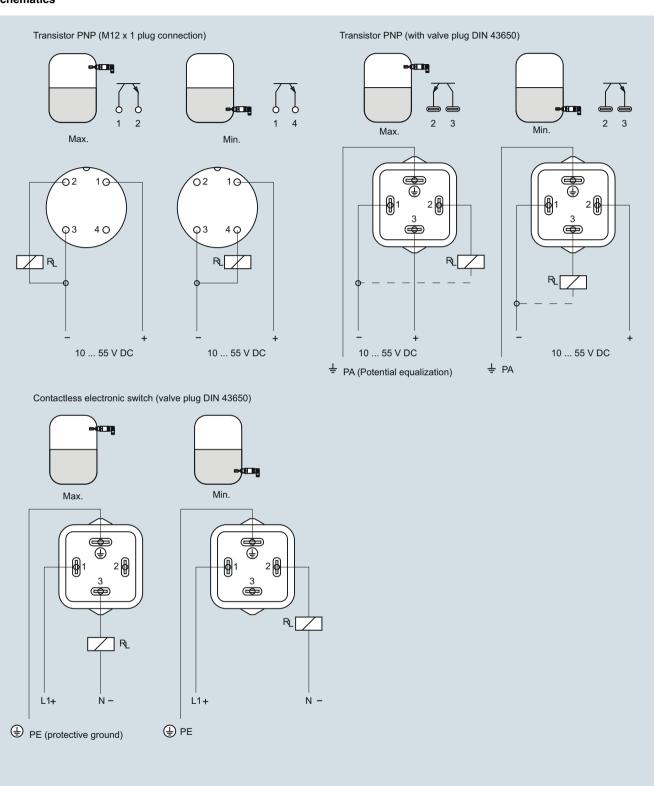


SITRANS LVL100, dimensions in mm (inch)

Point level measurement - Vibrating switches

### SITRANS LVL100

### Schematics



SITRANS LVL100, connections

Point level measurement - Vibrating switches

#### **SITRANS LVL200**

#### Overview



SITRANS LVL200 is a standard vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL 2 applications.

#### Benefits

- · Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Hygienic process connections

### Application

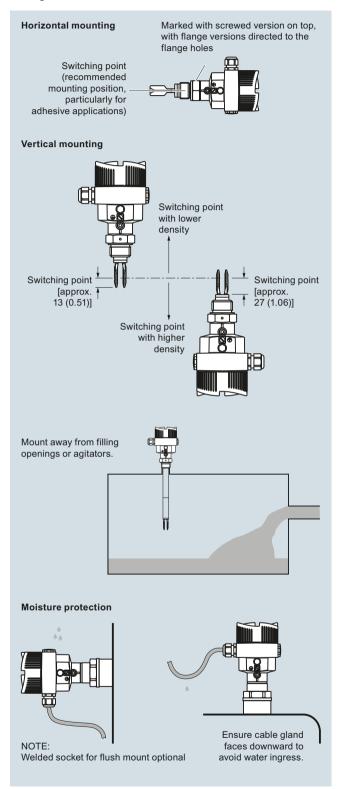
SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57 inch), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of > 0.5 g/cm³ (0.018 lb/in³). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

 Key Applications: For use in liquids and slurries, for level measurement, overfill, and dry run protection

### Configuration



SITRANS LVL200 installation, dimensions in mm (inch)

### Point level measurement - Vibrating switches

### SITRANS LVL200

# Technical specifications

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Mode of operation		Degree of protection	Type 4X/NEMA 4X/IP66/IP67
Measuring principle Input	Vibrating point level switch	Conduit entry	• 1 x M20x1.5 (cable: ø5 9 mm), 1 x blind stopper M20x1.5; attached
Measured variable	High and low and demand (via mode switch)		1 x M20x1.5 cable entry  1 x ½" NPT cable entry, 1 x blind stopper ½" NPT, 1 x ½" NPT cable entry
Output			• 1x M12x1;
Output options	<ul> <li>Relay output (DPDT), 2 floating SPDTs</li> <li>Contactless electronic switch</li> <li>2 wire Namur signal output</li> </ul>	Weight  • Device weight (dependent on process fitting)	1 x blind stopper M20x1.5  Approx. 0.8 4 kg (0.18 8.82 lb)
Measuring Accuracy		Tube extension	Approx. 920 g/m (10 oz/ft)
Repeatability	0.1 mm (0.004 inch)	(extended version)	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation	Power supply Supply voltage	
Switching delay	Approx. 500 ms (on/off)	Relay DPDT	20 253 V AC, 50/60 Hz, 20 72 V DC [at U>60 V DC]
Frequency	Approx. 1 200 Hz	<ul> <li>Contactless</li> </ul>	20 253 V AC, 50/60 Hz,
Rated operating conditions		• 2 wire NAMUR	20 253 V DC
Installation conditions • Location	Indoor/outdoor	Operating voltage (characteristics according to standard) for connection	
Ambient conditions  • Ambient temperature  • Installation category  • Pollution degree	-40 +70 °C (-40 +158 °F) III 2	to an amplifier according to NAMUR  Power consumption  Relay DPDT  Contactless	Short-circuit current I <sub>U</sub> approx. 8.2 mA  1 8 VA (AC), approx. 1.3 W (DC)  1 8 VA (AC), approx. 1.3 W (DC)  Domestic current requirement
Medium conditions Temperature LVL200S Standard LVL200S High temperature option LVL200E Standard: with 316L/Hastelloy LVL200E High temperature option:	-50 +150 °C (-58 +302 °F)		approx. 3 mA (via load circuit)  Load current  - Min. 10 mA  - Max. 400 mA [with I > 300 mA the ambient temperature can be max. 60 °C (140 °F)]  - Max. 4 A up to 40 ms (not WHG specified)
with 316L/Hastelloy • Pressure (vessel) • Density	-1 64 bar g (-14.5 928 psi g) 0.7 2.5 g/cm³ (0.025 0.09 lb/in³); 0.5 2.5 g/cm³ (0.018 0.09 lb/in³) by switching over	• 2 wire Namur	Current consumption - Falling characteristics ≥ 2.6 mA uncovered/≤ 0.6 mA covered - ≤ 0.6 mA uncovered/ ≥ 2.6 mA covered
Design			- Failure message ≤ 0.6 mA
Material • Enclosure	Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester Stainless steel housing, electropolished 316L	Certificates and approvals	<ul> <li>CE, CSA</li> <li>Overfill Protection WHG and VLAREM II</li> <li>FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D</li> <li>FM (Explosion-Proof) Class I, Div. 1,</li> </ul>
<ul> <li>Tuning fork</li> <li>Extension tube [ø 21.3 mm (0.839 inch)]</li> </ul>	316L (1.4404 or 1.4435), Hastelloy 316L (1.4404 or 1.4435), Hastelloy		Groups A, B, C, D; (Dust Ignition- Proof) Class II, III, Div. 1, Groups E, F, G1) • IECEX d IIC T6T2 Ga/Gb EHEDG
<ul> <li>Process connection: threaded</li> <li>Process connection: flange</li> </ul>	316L (1.4404 or 1.4435), Hastelloy 316L (1.4404 or 1.4435), 316L with Hastelloy, ECTFE, or PFA coating		<ul> <li>ATEX II 1/2G, 2G EEx d IIC T6</li> <li>ATEX II 1G, 1/2G, 2G EEx ia IIC T6 Shipping approvals</li> </ul>
<ul> <li>Process seal</li> <li>Process connection</li> <li>Pipe thread, cylindrical (ISO 228 T1)</li> </ul>	Klingersil C-4400		<ul> <li>BR-Éx d IIC T6 T2</li> <li>FDA, 3A, Ehedge</li> <li>SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)]</li> </ul>
<ul><li>Pipe thread, tapered</li><li>Flanges</li><li>Hygienic fittings</li></ul>	%" NPT, 1" NPT, 1½" NPT DIN from DN25, ANSI from 1" Bolting DN 40 PN 40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN 25 PN 40, Tuchenhagen Varivent DN 50 PN 10, SMS		

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Standard	7ML5746-	SITRANS LVL200, Standard	7ML5746-
Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	A 0	Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	- A 0
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  → → → → → → → → → → → → → → → → → → →		Conus DN 25, PN 40/316L Ra < 0.3 µm	A 3 0 A 3 1 A 3 2
Electronics Contactless electronic switch 20250 V AC/DC Double relay (DPDT) 20 72 V DC/20 250 V AC NAMUR signal <sup>1)</sup>	1 2 4	Conus DN 25, PN 40/ECTFE (ZB3033) <sup>5)</sup> Conus M52, PN 40/316L	A 3 2 A 3 3 A 3 4 A 3 5
Approvals Without approvals Overfill protection (WHG)	● A ● B	Tri-Clamp 1", PN 16/316L Ra < 0.3 μm	A 3 6 A 3 7
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG <sup>2)</sup> ATEX II 1/2G, 2G EEx d IIC T6 + WHG <sup>3)</sup> ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping	C D E	Tri-Clamp 1", PN 16/316L Ra < 0.8 μm Tri-Clamp 1½", PN 16/316L Ra < 0.3 μm	A 3 8 A 4 0 A 4 1
approvals <sup>2)</sup>	• F	Tri-Clamp 1½", PN 16/Hastelloy Tri-Clamp 1½", PN 16/316L Ra < 0.8 μm Tri-Clamp 2", PN 16/316L Ra < 0.3 μm	A 4 2 A 4 3 A 4 4
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2 D IP6X T <sup>2</sup> ) IECEx Ex ia IIC T6 <sup>2</sup> )	● G ● H	Tri-Clamp 2", PN 16/Hastelloy Tri-Clamp 2", PN 16/316L Ra < 0.8 μm	A 4 5 A 4 6
Shipping approvals  FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G (2)4)	• K	Tri-Clamp 2½", PN 10/316L Ra < 0.3 μm Tri-Clamp 2½", PN 10/316L Ra < 0.8 μm Tri-Clamp 3", PN 10/316L Ra < 0.3 μm	A 4 7 A 4 8 A 5 0
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G <sup>3)4)</sup>	<b>●</b> P	Tri-Clamp 3", PN 10/316L Ra < 0.3 µm  Tri-Clamp 3", PN 10/316L Ra < 0.8 µm  Bolting DN 32, PN 40 DIN11851/316L Ra < 0.3 µm	▲ A 5 1
FM (NI) Class I, Div. 2, Groups A, B, C, D <sup>4)</sup> IECEx d IIC T6T2 Ga/Gb	Q R	Bolting DN 32, PN 40 DIN11851/316L Ra < 0.8 µm Bolting DN 25, PN 40 DIN11851/316L Ra < 0.3 µm Bolting DN 25, PN 40 DIN11851/316L Ra < 0.8 µm	● A 5 4
CSA(XP)CL I, II, III Div. 1, Groups A, B, C, D, E, F, G CSA(NI)CL I, II, III, Div. 2, Groups A, B, C, D, E, F, G BR-Ex d IIC T6T2	● T	Bolting DN 40, PN 40 DIN11851/316L Ra < 0.3 μm Bolting DN 40, PN 40 DIN11851/316L Ra < 0.8 μm	A 5 6 A 5 7
CSA (IS) CL I, II, III Div. 1, Groups A, B, C, D, E, F, G <sup>2</sup>	V	Bolting DN 40, PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Bolting DN 50, PN 25 DIN11851/316L Ra < 0.3 µm	A 5 8
Process connection Thread G <sup>3</sup> / <sub>4</sub> " A, PN 64/316L Thread G <sup>3</sup> / <sub>4</sub> " A, PN 64/316L Ra < 0.8 µm	A 0 0	Bolting DN 50, PN 25 DIN11851/316L Ra < 0.8 μm	
Thread ¾" NPT, PN 64/316L  Thread ¾" NPT, PN 64/316L Ra < 0.8 μm  Thread ¾" NPT, PN 64/Monel	A 0 2 A 0 3 A 0 4	Hygienic w. compr. nut F40, PN 25/316L Hygienic w. compr. nut F40, PN 25/316L	A 6 3 A 6 4
Thread G¾" A, PN 64/Hastelloy	◆ A 0 5	Ra < 0.3 μm Hygienic w. compr. nut F40, PN 25/316L Ra < 0.8 μm	A 6 5
Thread G1" A, PN 64/316L Thread G1" A, PN 64/316L ECTFE coated MB1982 <sup>5)</sup>	A 0 7 A 0 8		A 6 6 A 6 7 A 6 8
Thread G1" A, PN 64/316L PFA coated <sup>5)</sup> Thread G1" A, PN 64/Monel Thread G1" A, PN 64 / 316L Ra<0.8µm	A 1 0 A 1 1 A 1 2	SMS DN 38/316L Ra < 0.8 µm <sup>5)</sup>	A 7 0 A 7 1 A 7 2
Thread G1" A, PN 64/316L Ra < 0.8 µm  Thread 1" NPT, PN 64/316L <sup>5)</sup> Thread 1" NPT, PN 64/316L ECTFE coatedMB1982 <sup>5)</sup>	A 1 3 A 1 4 A 1 5	Swagelok VCR screwing ZG2579, PN 64/316L Neumo biocontrol size 25, PN 16/316L Ra < $0.8~\mu m$ Neumo biocontrol size 50, PN 16/316L Ra < $0.8~\mu m^{5)}$	A 7 3 A 7 4 A 7 5
Thread 1" NPT, PN 64/316L PFA-coated Thread 1" NPT, PN 64/Monel Thread 1" NPT, PN 64/316L Ra < 0.8 µm	A 1 6 A 1 7 A 1 8	Neumo biocontrol size 65, PN 16/316L Ra < 0.8 μm Neumo biocontrol size 80, PN 16/316L Ra < 0.8 μm SÜDMO DN 50, PN 10/316L Ra<0,8μm	A 7 6 A 7 7 A 7 8
Thread G1" A, PN 64/Hastelloy Thread G1½" A, PN 64/316L	A 2 0 A 2 1	Small flange DN 25, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm Small flange DN 40, PN 1.5 DIN 28403/316L pol.	A 8 0 A 8 1
Thread G1½" A, PN 64/316L Ra<0,8µm Thread G1½" A, PN 64/Hastelloy Thread 1" NPT, PN 64/Hastelloy	A 2 2 A 2 3 A 2 4	Ra < 0.8 μm Ingold connection, PN 16/316L Ra < 0.8 μm Ingold connection, PN 16/Hastelloy	A 8 2 A 8 3
Thread 1½" NPT, PN 64/316L Thread 1½" NPT, PN 64/316L Ra<0,8µm	A 2 5 A 2 6	Terminal DN 33.7 PN 40 DIN11864-3-A-/316L BN2 Ra < 0.8 μm <sup>5)</sup> Hygienic fl. DN 50 PN 16 DIN11864-2-A-/316L	A 8 4 A 8 5
Thread 1½" NPT, PN 64/Hastelloy Thread G2" A, PN 64/316L	A 2 7 A 2 8	Ra < 0.8 μm	

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.		Selection and Ordering data	Article No.
SITRANS LVL200, Standard	7ML5746-		SITRANS LVL200, Standard	7ML5746-
Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	A	A 0	Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	- A 0
Flange DN 25, PN 6 Form C, DIN 2501/316L Flange DN 25, PN 6 Form C, DIN 2501/PFA <sup>5)</sup> Flange DN 25, PN 40 Form C, DIN 2501/316L	A 8 6 A 8 7 A 8 8		Flange DN 80, PN 40 Form C, DIN 2501/PFA <sup>5)</sup> Flange DN 80, PN 40 Form C, DIN 2501/ Enamelled <sup>6)</sup>	B 5 6 B 5 7
Flange DN 25, PN 40 Form C, DIN 2501/Hastelloy Flange DN 25, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 25, PN 40 Form C, DIN 2501/PFA <sup>5)</sup>	B 0 0 B 0 1 B 0 2		Flange DN 80, PN 40 Form F, DIN 2501/316L Flange DN 80, PN 40 Form N, DIN 2501/316L Flange DN 100, PN 16 Form C, DIN 2501/316L	B 5 8 B 6 0 B 6 2
Flange DN 25, PN 40 Form C, DIN 2501/Enamelled Flange DN 25, PN 40 Form D, DIN 2501/316L Flange DN 25, PN 40 Form F, DIN 2501/316L	B 0 3 B 0 4 B 0 5		Flange DN 100, PN 16 Form C, DIN 2501/Hastelloy Flange DN 100, PN 16 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 100, PN 16 Form C, DIN 2501/PFA <sup>5)</sup>	B 6 3 B 6 4 B 6 5
Flange DN 25, PN 40 Form N, DIN 2501/316L Flange DN 25, PN 40 Form N, DIN 2501/Hastelloy Flange DN 25, PN 40 Form N, DIN 2501/Monel	B 0 6 B 0 7 B 0 8		Flange DN 100, PN 16 Form C, DIN 2501/ Enamelled <sup>6)</sup> Flange DN 100, PN 16 Form D, DIN 2501/316L	B 6 6 B 6 7
solid Flange DN 25, PN 40 V13, DIN 2501/316L Flange DN 32, PN 40 Form C, DIN 2501/316L	B 1 0 B 1 1		Flange DN 100, PN 16 Form F, DIN 2501/316L Flange DN 100, PN 16 Form N, DIN 2501/316L Flange DN 100, PN 40 Form C, DIN 2501/316L	B 6 8 B 7 0 B 7 1
Flange DN 32, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 40, PN 6 Form C, DIN 2501/316L Flange DN 40, PN 6 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 40, PN 40 Form C, DIN 2501/316L	B 1 2 B 1 3 B 1 4 B 1 5		Flange DN 100, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 100, PN 40 Form C, DIN 2501/PFA <sup>5)</sup> Flange DN 100, PN 40 Form C, DIN 2501/ Enamelled <sup>6)</sup>	B 7 2 B 7 3 B 7 4
Flange DN 40, PN 40 Form C, DIN 2501/Hastelloy Flange DN 40, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 40, PN 40 Form C, DIN 2501/PFA <sup>5)</sup>	B 1 6 B 1 7 B 1 8		Flange DN 100, PN 40 Form F, DIN 2501/316L Flange DN 100, PN 40 Form N, DIN 2501/316L Flange DN 100, PN 40 V13, DIN 2501/316L	B 7 5 B 7 6 B 7 7
Flange DN 40, PN 40 Form C, DIN 2501/ Enamelled <sup>6)</sup> Flange DN 40, PN 40 Form F, DIN 2501/316L	B 2 0		Flange DN 100, PN 64 Form E, DIN 2501/316L Flange DN 100, PN 100 Form E, DIN 2501/316L Flange DN 100, PN 100 Form L, DIN 2501/316L	B 7 8 B 8 0 B 8 1
Flange DN 40, PN 40 Form N, DIN 2501/316L Flange DN 40, PN 40 Form E, DIN 2501/316L Flange DN 40, PN 40 V13, DIN 2501/316L	B 2 2 B 2 3 B 2 4		Flange DN 125, PN 16 Form F, DIN 2501/316L Flange DN 125, PN 40 Form C, DIN 2501/316L Flange DN 125, PN 40 Form N, DIN 2512/ 316L	B 8 2 B 8 3 B 8 4
Flange DN 50, PN 40 Form C, DIN 2501/316L Flange DN 50, PN 40 Form C, DIN 2501/Hastelloy Flange DN 50, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 50, PN 40 Form C, DIN 2501/ ECTFE (ZB3108) <sup>5)</sup>	B 2 5 B 2 6 B 2 7 B 2 8		Flange DN 150, PN 16 Form C, DIN 2501/316L Flange DN 150, PN 16 Form C, DIN 2501/Hastelloy Flange DN 150, PN 16 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 150, PN 16 Form C, DIN 2501/PFA <sup>5)</sup>	B 8 5 B 8 6 B 8 7 B 8 8
Flange DN 50, PN 40 Form C, DIN 2501/PFA <sup>5)</sup> Flange DN 50, PN 40 Form D, DIN 2501/316L Flange DN 50, PN 40 Form D, DIN 2501/Hastelloy	B 3 0 B 3 1 B 3 2		Flange DN 150, PN 16 Form D, DIN 2501/316L Flange DN 150, PN 40 Form C, DIN 2501/316L Flange DN 150, PN 40 Form C, DIN 2501/Hastelloy Flange DN 150, PN 40 Form F, DIN 2501/316L	C 0 0 C 0 1 C 0 2 C 0 3
Flange DN 50, PN 40 Form F, DIN 2501/316L Flange DN 50, PN 40 Form N, DIN 2501/316L Flange DN 50, PN 40 Form N, DIN 2501/Hastelloy	B 3 3 B 3 4 B 3 5		Flange DN 150, PN 40 Form N, DIN 2512/316L Flange DN 200, PN 10 Form C, DIN 2501/ECTFE <sup>5)</sup> Flange DN 200, PN 16 Form C, DIN 2501/316L	C 0 4 C 0 5 C 0 6
Flange DN 50, PN 40 Form E, DIN 2501/316L Flange DN 50, PN 40 V13, DIN 2501/316L Flange DN 50, PN 40 R13, DIN 2501/316L	B 3 6 B 3 7 B 3 8		Flange DN 25, PN 40 Form B1, EN 1092-1/316L Flange DN 25, PN 40 Form B1, EN 1092-1/Hastelloy Flange DN 25, PN 40 Form B1, EN/ 316L/ PFA <sup>5)</sup>	C 0 7 C 0 8 C 1 0
Flange DN 50, PN 64 Form F, DIN 2501/316L Flange DN 50, PN 64 Form N, DIN 2501/Hastelloy Flange DN 50, PN 64 Form C, DIN 2501/316L	B 4 0 B 4 1 B 4 2		Flange DN 25, PN 40 Form B1, EN 1092-1/ Enamelled <sup>6)</sup> Flange DN 25, PN 40 Form B2, EN 1092-1/316L	C11 C12
Flange DN 50, PN 64 Form L, DIN 2501/316L Flange DN 50, PN 100 Form E, DIN 2501/316L Flange DN 50, PN 100 Form L, DIN 2501/316L	B 4 3 B 4 4 B 4 5		Flange DN 25, PN 40 Form F, EN 1092-1/316L Flange DN 25, PN 63 Form B1, EN 1092-1/316L Flange DN 25, PN 100 Form B2, EN 1092-1/316L	C 1 3 C 1 4 C 1 5
Flange DN 65, PN 40 Form C, DIN 2501/316L Flange DN 65, PN 40 Form C, DIN 2501/Hastelloy Flange DN 65, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup>	B 4 6 B 4 7 B 4 8		Flange DN 40, PN 40 Form B1, EN/ 316L Flange DN 40, PN 40 Form B1, EN 1092-1/PFA <sup>5)</sup> Flange DN 40, PN 40 Form B2, EN/316L	C 1 6 C 1 7 C 1 8
Flange DN 65, PN 40 Form C, DIN 2501/PFA <sup>5)</sup> Flange DN 65, PN 40 Form F, DIN 2501/316L Flange DN 65, PN 64 Form E, DIN 2501/316L	B 5 0 B 5 1 B 5 2		Flange DN 50, PN 40 Form B1, EN/316L Flange DN 50, PN 40 Form B1, EN 1092-1/ Hastelloy	C 2 0 C 2 1
Flange DN 80, PN 64 FORM E, DIN 2501/316L Flange DN 80, PN 40 Form C, DIN 2501/316L Flange DN 80, PN 40 Form C, DIN 2501/ Hastelloy	B 5 3 B 5 4		Flange DN 50, PN 40 Form B1, EN 1092-1/ Monel ZB2977 Flange DN 50, PN 40 Form B1, EN 1092-1/ECTFE <sup>5)</sup>	C 2 2 C 2 3
Flange DN 80, PN 40 Form C, DIN 2501/ECTFE <sup>5)</sup>	B 5 5		Flange DN 50, PN 40 Form B1, EN/ 316L/PFA <sup>5)</sup>	C 2 4

Point level measurement - Vibrating switches

Selection and Ordering data	Article No.		Selection and Ordering data	Article No.
SITRANS LVL200, Standard	7ML5746-		SITRANS LVL200, Standard	7ML5746-
Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.		<b>A</b> 0	Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	- A 0
Flange DN 50, PN 40 Form B1, EN 1092-1/ Enamelled <sup>6)</sup>	C 2 5		Flange 2" 300 lb RF, ANSI B16.5/316L Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 8 2 C 8 3
Flange DN 50, PN 40 Form C, EN 1092-1/316L Flange DN 50, PN 40 Form D, EN/316L	C 2 6 C 2 7		Flange 2" 300 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 2" 300 lb RF, ANSI B16.5/PFA <sup>5)</sup>	C 8 5 C 8 6
Flange DN 50, PN 40 Form D, EN 1092-1/Hastelloy Flange DN 50, PN 40 Form B2, EN 1092-1/316L Flange DN 50, PN 40 Form E, EN 1092-1/316L	C 2 8 C 3 0 C 3 1		Flange 2" 300 lb RF, ANSI B16.5 Enamelled <sup>6)</sup> Flange 2" 300 lb RJF, ANSI B16.5/316L	C 8 7 C 8 8
Flange DN 80, PN 40 Form B1, EN 1092-1/316L Flange DN 80, PN 40 Form B1, EN 1092-1/Hastelloy Flange DN 80, PN 40 Form B1, EN 1092-1/ECTFE <sup>5)</sup>	C 3 2 C 3 3 C 3 4		Flange 2" 300 lb ST, ANSI B16.5/316L Flange 2" 300 lb LG (large groove), ANSI B16.5/316L Flange 2" 300 lb LT, ANSI B16.5/316L	D 0 0 D 0 1
Flange DN 80, PN 40 Form B1, EN 1092-1/ Enamelled <sup>6)</sup> Flange DN 80, PN 40 Form B2, EN 1092-1/316L	C 3 5		Flange 2" 600 lb RF, ANSI B16.5/316L Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977	D 0 3 D 0 4
Flange DN 100, PN 16 Form B1, EN 1092-1/316L Flange DN 100, PN 16 Form B1, EN 1092-1/ Hastelloy	C 3 7 C 3 8		Flange 2" 600 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 2" 600 lb RJF, ANSI B16.5/316L Flange 2" 600 lb LG, ANSI B16.5/316L	D 0 5 D 0 6 D 0 7
Flange DN 100, PN 16 Form B1, EN 1092-1/ Enamelled <sup>6)</sup> Flange DN 100, PN 40 Form B1, EN 1092-1/316L	C 4 0 C 4 1		Flange 2" 900 lb RJF, ANSI B16.5/316L Flange 2½" 150 lb RF, ANSI B16.5/316L Flange 2½" 300 lb RF, ANSI B16.5/316L	D 0 8 D 1 0 D 1 1
Flange DN 100, PN 40 Form B1, EN 1092-1/ Enamelled <sup>6)</sup> Flange DN 100, PN 40 Form C, EN 1092-1/316L	C 4 2		Flange 3" 150 lb RF, ANSI B16.5/316L Flange 3" 150 lb RF, ANSI B16.5/Hastelloy Flange 3" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup>	D12 D13 D14
Flange DN 100, PN 63 Form B2, EN 1092-1/316L Flange DN 150, PN 16 Form B1, EN 1092-1/316L	C 4 4 C 4 5		Flange 3" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup> Flange 3" 150 lb RF, ANSI B16.5/Enamelled <sup>6)</sup>	D 1 5 D 1 6
Flange DN 150, PN 16 Form B1, EN 1092-1/PFA <sup>5)</sup> Flange DN 150, PN 40 Form B1, EN 1092-1/316L	C 4 6 C 4 7		Flange 3" 150 lb FF, ANSI B16.5/316L Flange 3" 150 lb FF, ANSI B16.5/ECTFE <sup>5)</sup>	D17 D18
Flange DN 150, PN 40 Form B1, EN 1092-1/ ECTFE <sup>5)</sup>	C 4 8		Flange 3" 150 lb FF, ANSI B16.5/PFA <sup>5)</sup> Flange 3" 300 lb RF, ANSI B16.5/316L	D 2 0 D 2 1
Flange DN 150, PN 40 Form B2, EN 1092-1/316L Flange 1" 150 lb ANSI B16.5/316L Flange 1" 150 lb RF, ANSI B16.5/Hastelloy	C 5 0 C 5 1 C 5 2		Flange 3" 300 lb RF, ANSI B16.5/Hastelloy Flange 3" 300 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 3" 300 lb RF, ANSI B16.5/PFA <sup>5)</sup>	D 2 2 D 2 3 D 2 4
Flange 1" 150 lb RF, ANSI B16.5/Monel ZB2977 Flange 1" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup>	C 5 3 C 5 4		Flange 3" 300 lb RF, ANSI B16.5/Enamelled <sup>6)</sup> Flange 3" 600 lb RF, ANSI B16.5/316L Flange 3½" 150 lb RF, ANSI B16.5/316L	D 2 5 D 2 6 D 2 7
Flange 1" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup> Flange 1" 150 lb RF, ANSI B16.5/Enamelled <sup>6)</sup> Flange 1" 300 lb RF, ANSI B16.5/316L	C 5 5 C 5 6 C 5 7		Flange 3½" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 4" 150 lb RF, ANSI B16.5/316L	D 2 8 D 3 0
Flange 1" 300 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 1" 600 lb RF, ANSI B16.5/316L Flange 1½" 150 lb RF, ANSI B16.5/316L	C 5 8 C 6 0 C 6 1		Flange 4" 150 lb RF, ANSI B16.5/Hastelloy Flange 4" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 4" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup>	D 3 1 D 3 2 D 3 3
Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy Flange 1½" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 1½" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup>	C 6 2 C 6 3 C 6 4		Flange 4" 150 lb RF, ANSI B16.5/Enamelled <sup>6)</sup> Flange 4" 150 lb LT, ANSI B16.5/316L Flange 4" 300 lb RF, ANSI B16.5/316L	D 3 4 D 3 5 D 3 6
Flange 1½" 150 lb RF, ANSI B16.5 Enamelled <sup>6)</sup> Flange 1½" 150 lb FF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 1½" 300 lb RF, ANSI B16.5/316L	C 6 5 C 6 6 C 6 7		Flange 4" 300 lb RF, ANSI B16.5/Hastelloy Flange 4" 300 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 4" 300 lb RJF, ANSI B16.5/316L	D 3 7 D 3 8 D 4 0
Flange 1½" 300 lb RF, ANSI B 16.5/Monel ZB2977 Flange 1½" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 1½" 600 lb RF, ANSI B16.5/316L	C 6 8 C 7 0 C 7 1		Flange 4" 300 lb HJF, ANSI B16.5/316L Flange 4" 300 lb LG, ANSI B16.5/316L Flange 4" 300 lb LT, ANSI B16.5/316L Flange 4" 600 lb RF, ANSI B16.5/316L	D 4 1 D 4 2 D 4 3
Flange 2" 150 lb RF, ANSI B16.5/316L Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	C 7 2 C 7 3		Flange 4" 600 lb RJF, ANSI B16.5/316L Flange 6" 150 lb RF, ANSI B16.5/316L	D 4 4 D 4 5
Flange 2" 150 lb RF, ANSI B16.5/Monel ZB2977 Flange 2" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 2" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup>	C 7 4 C 7 5 C 7 6		Flange 6" 150 lb RF, ANSI B16.5/Hastelloy Flange 6" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 6" 150 lb RF, ANSI B16.5/PFA <sup>5)</sup>	D 4 6 D 4 7 D 4 8
Flange 2" 150 lb RF, ANSI B16.5/Enamelled <sup>6)</sup> Flange 2" 150 lb FF, ANSI B16.5/316L	C 7 7 C 7 8		Flange 6" 150 lb RJF, ANSI B16.5/316L Flange 6" 300 lb RF, ANSI B16.5/316L	D 5 0 D 5 1
Flange 2" 150 lb FF, ANSI B16.5/ECTF <sup>5)</sup> Flange 2" 150 lb SG (small groove), ANSI B16.5/316L	C 8 0 C 8 1		Flange 8" 150 lb RF, ANSI B16.5/316L Flange 8" 150 lb RF, ANSI B16.5/ECTFE <sup>5)</sup> Flange 1" BS.10 Table E/316L	D 5 2 D 5 3 D 5 4

### Point level measurement - Vibrating switches

Selection and Ordering data	Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5746-
Flange 1" BS.10 Table E/PFA <sup>5)</sup> Flange 1½" BS.10 Table E/316L Flange 3½" BS.10 Table E/316L Flange 4" BS.10 Table E/ECTFE <sup>5)</sup> Flange DN 40 10K, JIS/316L	D 5 5 D 5 6 D 5 7 D 5 8 D 6 0
Flange DN 50 10K, JIS/316L  Flange DN 80 10K, JIS/316L  Flange DN 100 10K, JIS/316L  Adapter/Process temperature  Without adapter/-50 +150 °C (-58 +302 °F)  With adapter/-50 +200 °C (-58 +392 °F) <sup>7)</sup>	D 6 1 D 6 2 D 6 3
With adapter/-50 +250 °C (-58 +482 °F)  With gas-tight leadthrough/-50 +150 °C (-58 +302 °F)  With gas-tight leadthrough/-50 +250 °C (-58 +482 °F)	3 4 5
Housing/ Cable entry Aluminium IP66/IP67/M20x1.5 Aluminium IP66/IP67/½" NPT 316L stainless steel (electropolished) IP66/IP67/M20X1.5 <sup>8)9)</sup> 316L stainless steel (electropolished) IP66/IP67/½" NPT <sup>8)9)</sup>	A B C

- 1) Available with Adapter/Process temperature options 1, 3, 4, and 5 only
- 2) Available with Electronics option 4 only
- 3) Available with Adapter/Process temperature options 1 and 3 only
- 4) Available with Housing/Cable entry option B only
- 5) Available with Adapter/Process temperature options 1 and 4 only
- $^{6)}$  Available with Adapter/Process temperature options 1, 2, and 4 only
- 7) Available with enamelled Process connection options only
- $^{8)}\,$  Available with Approval options A, B, C only
- 9) Not available with SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cleaning including Certificate (oil, grease, and silicone free)	W01
Identification Label (measurement loop) stainless steel: max. 16 characters add in plain text	Y17
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	Y18
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) <sup>1)</sup>	D07
2.2-Factory certificate for material (EN 10204) <sup>1)</sup>	C15

Selection and Ordering data	Order code
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 615111)	C20
Dye penetration test + 3.1 certificate/instrument <sup>1)</sup>	C13
X-ray test + 3.1 certificate/instrument <sup>1)</sup>	C14
Positive material identification test + 3.1 certificate/instrument <sup>1)</sup>	C16
Roughness test + 3.1 certificate/instrument <sup>1)</sup>	C18
3.1-Inspection Certificate for instrument with test data (EN 10204)	C25
Quality and test plan	C26
Pressure test + 3.1 certificate/instrument <sup>1)</sup>	C31
Helium leak test + 3.1 certificate/instrument <sup>1)</sup>	C32
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument <sup>1)</sup>	C60
Pressure test according to Norsok + 3.1 certificate/instrument 1)	C61
Additional Operating Instructions	Article No.
LVL200 (DPDT Relay)	
• English	7ML1998-5KR01
• French	7ML1998-5KR11
• Spanish	7ML1998-5KR21
• German	7ML1998-5KR31
LVL200 (Contactless electronic switch)	
• English	7ML1998-5KQ01
• French	7ML1998-5KQ11
• Spanish	7ML1998-5KQ21
• German	7ML1998-5KQ31
Electronics module LVL200 Relay	
• English	7ML1998-5LS01
• French	7ML1998-5LS11
• Spanish	7ML1998-5LS21
<ul> <li>German         This device is shipped with the Siemens Milltronics manual DVD containing the Operating Instructions library.     </li> </ul>	7ML1998-5LS31
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless LVL200 Threaded Welded Socket	7ML1930-6AA
• G <sup>3</sup> / <sub>4</sub> " A/316L with FKM Seal	7ML1930-1EE
• G1" A/316L with FKM Seal	7ML1930-1EF
• M27x1.5/316L with FKM Seal	7ML1930-1EG
• G¾" A/316L with EPDM Seal	7ML1930-1EH
• G1" A/316L with EPDM Seal	7ML1930-1EJ
M27x1.5/316L with EPDM Seal	7ML1930-1EK
1) 1: 0	

<sup>1)</sup> Listed Certificates are not available with all configurations, please contact factory for more information

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.	
SITRANS LVL200, Rigid extension		
Compact vibrating level switch for material detection in liquid applications such as overflow, high,	E-111-111	
low, and demand applications, as well as pump		
protection. For use in SIL-2 and hazardous applications.		
tion in the PIA Life Cycle Portal.		
Electronics		
Contactless electronic switch 20250 V AC/DC Double relay (DPDT) 20 72 V DC/20 250 V AC	1 2	
NAMUR signal <sup>1)</sup>	4	
Approvals		
Without approvals	A	
Overfill protection (WHG) ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG <sup>2)</sup>	B C	
ATEX II 1/2G, 2G EEx d IIC T6 + WHG <sup>3)4)</sup>	D	
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals <sup>2)</sup>	E	
	F	
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals <sup>3)4)</sup>		
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2D IP6X T <sup>2)</sup>	G	
IECEx Ex ia IIC T6 <sup>2)</sup>	н	
Shipping approvals	K	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G (2)5)  FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP)	N P	
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G <sup>3)4</sup> ,5)		
FM (NI) Class I, Div. 2, Groups A, B, C, D <sup>5)</sup>	Q	
IECEx d IIC T6T2 Ga/Gb <sup>4)</sup> CSA(XP)CL I,II,III Div. 1,Groups A, B, C, D, E, F,	R S	
GT2 <sup>4)</sup> Ga/Gb		
CSA(NI)CL I,II,III, Div. 2,Groups A, B, C, D, E, F, G	Ţ	
BR-Ex d IIC T6T2 CSA (IS) CL I, II, III Div. 1, Groups A, B, C, D, E, F,	V	
G <sup>2)</sup>		
Process connection		
Thread $G^{3/4}$ " A, PN 64/316L Thread $G^{3/4}$ " A, PN 64/316L Ra < 0.8 µm	A 0 0 A 0 1	
Thread 3/4" A, TN 64/316L Ta < 0.0 pm	A 0 2	
Thread ¾" NPT, PN 64/316L Ra < 0.8 μm	A 0 3	
Thread ¾" NPT, PN 64/Monel Thread G¾" A, PN 64/Hastelloy	A 0 4 A 0 5	
Thread 3/4" NPT, PN 64/Hastelloy	A 0 6	
Thread G1" A, PN 64/316L	A 0 7	
Thread G1" A, PN 64/316L ECTFE coated MB1982 <sup>6)</sup>	A 0 8	
Thread G1" A, PN 64/316L PFA coated <sup>6)</sup>	A 1 0	
Thread G1" A, PN 64/Monel	A 1 1	
Thread G1" A, PN 64/316L Ra < 0.8 μm	A 1 3	
Thread 1" NPT, PN 64/316L Thread 1" NPT, PN 64/316L ECTFE coated MB1982 <sup>6)</sup>	A 1 4 A 1 5	
Thread 1" NPT, PN 64/316L PFA coated <sup>6)</sup>	A 1 6	
Thread 1" NPT, PN 64/Monel	A 1 7	
Thread 1" NPT, PN 64/316L Ra < 0.8 µm Thread G1" A, PN 64/Hastelloy	A 1 8 A 2 0	
Thread G1½" A, PN 64/316L	A 2 1	
Thread G11/2" A, PN 64/316L Ra <0.8 µm	A 2 2	
Thread G1½" A, PN 64/Hastelloy	A 2 3	
Thread 1" NPT, PN 64/Hastelloy Thread 11/2" NPT, PN 64/316L	A 2 4 A 2 5	
Thread 1½" NPT, PN 64/316L Ra< 0.8 µm	A 2 6	
Thread 11/2" NPT, PN 64/Hastelloy	A 2 7	
Thread G2" A, PN 64/316L Thread M27x1.5 PN 64/316L	A 2 8 A 3 0	

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detec-	7ML5747-
tion in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	
Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984 <sup>6)</sup> Conus DN 25 PN 40/316L Ra < 0.3 µm Conus DN 25 PN 40/316L Ra < 0.8 µm.	A 3 1 A 3 2 A 3 3
Conus DN 25 PN 40/ECTFE (ZB3033) <sup>6)</sup> Conus M52 PN 40/316L Conus M52 PN 40/316L Ra < 0.3 µm	A 3 4 A 3 5 A 3 6
Conus M52 PN 40/316L Ra < 0.8 μm Tri-Clamp 1" PN 16/316L Ra < 0.3 μm Tri-Clamp 1" PN 16/Hastelloy	A 3 7 A 3 8 A 4 0
Tri-Clamp 1" PN 16/316L Ra $<$ 0.8 $\mu$ m Tri-Clamp 1½" PN 16/316L Ra $<$ 0.3 $\mu$ m Tri-Clamp 1½" PN 16/Hastelloy	A 4 1 A 4 2 A 4 3
Tri-Clamp 1½" PN 16/316L Ra < 0.8 μm Tri-Clamp 2" PN 16/316L Ra < 0.3 μm Tri-Clamp 2" PN 16/Hastelloy	A 4 4 A 4 5 A 4 6
Tri-Clamp 2" PN 16/316L Ra < 0.8 μm Tri-Clamp 2½" PN 10/316L Ra < 0.3 μm Tri-Clamp 2½" PN 10/316L Ra < 0.8 μm	A 4 7 A 4 8 A 5 0
Tri-Clamp 3" PN 10/316L Ra < 0.3 µm Tri-Clamp 3" PN 10/316L Ra < 0.8 µm Bolting DN 32 PN 40 DIN11851/316L Ra < 0.3 µm	A 5 1 A 5 2 A 5 3
Bolting DN 32 PN 40 DIN11851/316L Ra < 0.8 $\mu$ m Bolting DN 25 PN 40 DIN11851/316L Ra < 0.3 $\mu$ m Bolting DN 25 PN 40 DIN11851/316L Ra < 0.8 $\mu$ m	A 5 4 A 5 5 A 5 6
Bolting DN 40 PN 40 DIN11851/316L Ra < 0.3 μm Bolting DN 40 PN 40 DIN11851/316L Ra < 0.8 μm Bolting DN 40 PN 40 DIN11864-1 A/316L Ra < 0.8 μm ZB3052	A 5 7 A 5 8 A 6 0
Bolting DN 50 PN 25 DIN11851/316L Ra < 0.3 μm Bolting DN 50 PN 25 DIN11851/316L Ra < 0.8 μm Bolting DN 50 PN 25 DIN11864-1 A/316L Ra < 0.8 μm ZB3052	A 6 1 A 6 2 A 6 3
Hygienic w.compr.nut F40 PN 25/316L Hygienic w.compr.nut F40 PN 25/316L Ra < 0.3 µm Hygienic w.compr.nut F40 PN 25/316L Ra < 0.8 µm	A 6 4 A 6 5 A 6 6
Varivent N50-40/316L Ra < 0.3 µm Varivent N50-40/316L Ra < 0.8 µm Varivent N125/100/316L Ra < 0.8 µm	A 6 7 A 6 8 A 7 0
DRD flange PN 40/316L ZB3007 SMS DN 38/316L Ra < 0.8 μm <sup>6)</sup> SMS DN 51 PN 6/316L Ra < 0.8 μm <sup>6)</sup>	A 7 1 A 7 2 A 7 3
Swagelok VCR screwing ZG2579 PN 64/316L Neumo biocontrol size 25 PN 16/316L Ra < 0.8 µm Neumo biocontrol size 50 PN 16/316L Ra < 0.8 µm	A 7 4 A 7 5 A 7 6
Neumo biocontrol size 65 PN 16/316L Ra < 0.8 μm Neumo biocontrol size 80 PN 16/316L Ra < 0.8 μm SÜDMO DN 50 PN 10/316L Ra < 0.8 μm	A 7 7 A 7 8 A 8 0
Small flange DN 25 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm Small flange DN 40 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A 8 1 A 8 2
Ingold connection PN 16/316L Ra < 0.8 µm Terminal DN 33.7 PN 40 DIN 11864-3-A-/316L BN2	A 8 3 A 8 4
Ra < 0.8 µm Hygienic fl. DN 50 PN 16 DIN 11864-2-A-/316L Ra < 0.8 µm Flange DN 25 PN 6 Form C, DIN 2501/316L	A 8 5
1 1ange DIN 23 FIN 0 FUITH 6, DIN 230 1/3 10L	A 8 6

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5747-	SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5747-
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.  Flange DN 25 PN 6 Form C, DIN 2501/PFA <sup>6</sup> ) Flange DN 25 PN 40 Form C, DIN 2501/Hastelloy Flange DN 25 PN 40 Form C, DIN 2501/Hastelloy Flange DN 25 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 25 PN 40 Form D, DIN 2501/FA <sup>6</sup> ) Flange DN 25 PN 40 Form D, DIN 2501/316L Flange DN 25 PN 40 Form D, DIN 2501/316L Flange DN 25 PN 40 Form N, DIN 2501/316L Flange DN 25 PN 40 Form N, DIN 2501/316L Flange DN 25 PN 40 Form N, DIN 2501/Monel solid Flange DN 25 PN 40 Form N, DIN 2501/Monel solid Flange DN 25 PN 40 Form C, DIN 2501/Monel solid Flange DN 32 PN 40 Form C, DIN 2501/316L Flange DN 32 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 32 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 6 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 6 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/Hastelloy Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 40 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 50 PN 40 Form C, DIN 2501/316L Flange DN 50 PN 40 Form C, DIN 2501/316L Flange DN 50 PN 40 Form C, DIN 2501/Hastelloy Flange DN 50 PN 40 Form C, DIN 2501/FAA <sup>6</sup> ) Flange DN 50 PN 40 Form C, DIN 2501/Hastelloy Flange DN 50 PN 40 Form C, DIN 2501/Hastelloy Flange DN 50 PN 40 Form D, DIN 2501/316L Flange DN 50 PN 40 Form D, DIN 2501/316L Flange DN 50 PN 40 Form D, DIN 2501/316L Flange DN 50 PN 40 Form D, DIN 2501/Hastelloy Flange DN 50 PN 40 Form D, DIN 2501/316L Flange DN 50 PN 40 Form D, DIN 2501/316L Flange DN 50 PN 40 Form D, DIN 2501/Hastelloy Flange DN 50 PN 40 Form D, DIN 25	A 8 7 A 8 8 B 0 0 B 0 1 B 0 2 B 0 3 B 0 4 B 0 5 B 0 6 B 0 7 B 0 8 B 1 0 B 1 1 B 1 2 B 1 3 B 1 4 B 1 5 B 1 6 B 1 7 B 1 8 B 2 0 B 2 1 B 2 2 B 2 3 B 2 4 B 2 5 B 2 6 B 2 7 B 2 8 B 3 0 B 3 1 B 3 2 B 3 3 B 3 4 B 3 5	SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.  Flange DN 80 PN 40 Form N, DIN 2501/316L Flange DN 80 PN 40 Form C, DIN 2501/Hastelloy Flange DN 100 PN 16 Form C, DIN 2501/Hastelloy Flange DN 100 PN 16 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 100 PN 16 Form C, DIN 2501/FA6) Flange DN 100 PN 16 Form D, DIN 2501/316L Flange DN 100 PN 16 Form D, DIN 2501/316L Flange DN 100 PN 16 Form F, DIN 2501/316L Flange DN 100 PN 16 Form N, DIN 2501/316L Flange DN 100 PN 40 Form C, DIN 2501/316L Flange DN 100 PN 40 Form C, DIN 2501/316L Flange DN 100 PN 40 Form C, DIN 2501/FCFFE <sup>6</sup> ) Flange DN 100 PN 40 Form C, DIN 2501/FCFFE <sup>6</sup> ) Flange DN 100 PN 40 Form C, DIN 2501/FA6) Flange DN 100 PN 40 Form C, DIN 2501/FA6) Flange DN 100 PN 40 Form E, DIN 2501/316L Flange DN 100 PN 40 Form F, DIN 2501/316L Flange DN 100 PN 40 Form E, DIN 2501/316L Flange DN 100 PN 40 Form E, DIN 2501/316L Flange DN 100 PN 64 Form E, DIN 2501/316L Flange DN 100 PN 100 Form E, DIN 2501/316L Flange DN 100 FN 100 Form E, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 150 PN 40 Form N, DIN 2501/316L Flange DN 150 PN 40 Form C, DIN 2501/316L Flange DN 150 PN 40 Form C, DIN 2501/316L Flange DN 150 PN 40 Form B, DIN 2501/316L Flange DN 150 PN 40 Form B, DIN 2501/316L Flange DN 25 PN 40 Form B1, EN 1092-1/4Lastelloy Flange DN 25 PN 40 Form B1, EN 1092-1/4Lastelloy Flange	B 5 7 B 5 8 B 6 0 B 6 1 B 6 2 B 6 3 B 6 4 B 6 5 B 6 6 B 6 7 B 7 1 B 7 2 B 7 3 B 7 4 B 7 5 B 7 6 B 7 7 B 7 8 B 8 0 B 8 1 B 8 2 B 8 3 B 8 4 B 8 5 B 8 6 B 8 7 B 8 8 C 0 0 C 0 1 C 0 2 C 0 3 C 0 4 C 0 5 C 0 6
Flange DN 50 PN 40 Form E, DIN 2501/316L Flange DN 50 PN 40 V13, DIN 2501/316L Flange DN 50 PN 40 R13, DIN 2501/316L Flange DN 50 PN 64 Form F, DIN 2501/316L Flange DN 50 PN 64 Form N, DIN 2501/316L Flange DN 50 PN 64 Form C, DIN 2501/316L Flange DN 50 PN 64 Form L, DIN 2501/316L Flange DN 50 PN 100 Form E, DIN 2501/316L Flange DN 65 PN 40 Form C, DIN 2501/316L Flange DN 65 PN 40 Form C, DIN 2501/316L Flange DN 65 PN 40 Form C, DIN 2501/Hastelloy Flange DN 65 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 65 PN 40 Form C, DIN 2501/FA6 Flange DN 65 PN 40 Form E, DIN 2501/316L Flange DN 65 PN 40 Form C, DIN 2501/316L Flange DN 65 PN 64 Form E, DIN 2501/316L Flange DN 80 PN 40 Form C, DIN 2501/316L Flange DN 80 PN 40 Form C, DIN 2501/316L Flange DN 80 PN 40 Form C, DIN 2501/Hastelloy Flange DN 80 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 80 PN 40 Form C, DIN 2501/ECTFE <sup>6</sup> ) Flange DN 80 PN 40 Form C, DIN 2501/FAF <sup>6</sup> ) Flange DN 80 PN 40 Form C, DIN 2501/FFA <sup>6</sup> ) Flange DN 80 PN 40 Form F, DIN 2501/FFA <sup>6</sup> )	B 3 5 B 3 6 B 3 7 B 3 8 B 4 0 B 4 1 B 4 2 B 4 3 B 4 4 B 4 5 B 4 6 B 4 7 B 4 8 B 5 0 B 5 1 B 5 2 B 5 3 B 5 4 B 5 5 B 5 6	Flange DN 25 PN 40 Form B1, EN 1092-1/ Enamelled <sup>7</sup> ) Flange DN 25 PN 40 Form B2, EN 1092-1/316L Flange DN 25 PN 40 Form F, EN 1092-1/316L Flange DN 25 PN 63 Form B1, EN 1092-1/316L Flange DN 25 PN 100 Form B2, EN 1092-1/316L Flange DN 40 PN 40 Form B1, EN/316L Flange DN 40 PN 40 Form B1, EN 1092-1/PFA <sup>6</sup> ) Flange DN 40 PN 40 Form B2, EN/316L Flange DN 50 PN 40 Form B1, EN 1092-1/Hastelloy Flange DN 50 PN 40 Form B1, EN 1092-1/Hastelloy Flange DN 50 PN 40 Form B1, EN 1092-1/FCTFE <sup>6</sup> ) Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE <sup>6</sup> ) Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE <sup>6</sup> ) Flange DN 50 PN 40 Form B1, EN 1092-1/Enamelled <sup>7</sup> ) Flange DN 50 PN 40 Form B1, EN 1092-1/Enamelled <sup>7</sup> ) Flange DN 50 PN 40 Form C, EN 1092-1/316L	C 0 7 C 0 8 C 1 0 C 1 1 C 1 2 C 1 3 C 1 4 C 1 5 C 1 6 C 1 7 C 1 8 C 2 0 C 2 1 C 2 2 C 2 3

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension	7ML5747-	SITRANS LVL200, Rigid extension	7ML5747-
Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.		Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	
Flange DN 50 PN 40 Form D, EN/316L Flange DN 50 PN 40 Form D, EN 1092-1/ Hastelloy	C 2 4 C 2 5	Flange 2" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 2" 300 lb RF, ANSI B16.5/PFA <sup>6)</sup>	C 8 2 C 8 3 C 8 4
Flange DN 50 PN 40 Form B2, EN 1092-1/316L	C 2 6	Flange 2" 300 lb RF, ANSI B16.5 Enamelled () Flange 2" 300 lb RJF, ANSI B16.5/316L	C 8 5
Flange DN 50 PN 40 Form E, EN 1092-1/316L Flange DN 80 PN 40 Form B1, EN 1092-1/316L Flange DN 80 PN 40 Form B1, EN 1092-1/Hastelloy	C 2 7 C 2 8 C 3 0	Flange 2" 300 lb ST, ANSI B16.5/316L Flange 2" 300 lb LG (large groove),	C 8 6 C 8 7
Flange DN 80 PN 40 Form B1, EN 1092-1/ECTFE <sup>6)</sup> Flange DN 80 PN 40 Form B1, EN 1092-1/ Enamelled <sup>7)</sup>	C 3 1 C 3 2	ANSI B16.5/316L Flange 2" 300 lb LT, ANSI B16.5/316L Flange 2" 600 lb RF, ANSI B16.5/316L	C 8 8 D 0 0
Flange DN 80 PN 40 Form B2, EN 1092-1/316L	C 3 3	Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977 Flange 2" 600 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	D 0 1 D 0 2
Flange DN 100 PN 16 Form B1, EN 1092-1/316L Flange DN 100 PN 16 Form B1, EN 1092-1/ Hastelloy	C 3 4 C 3 5	Flange 2" 600 lb RJF, ANSI B16.5/316L Flange 2" 600 lb LG, ANSI B16.5/316L	D 0 3
Flange DN 100 PN 16 Form B1, EN 1092-1/ Enamelled <sup>7)</sup>	C 3 6	Flange 2" 900 lb RJF, ANSI B16.5/316L Flange 21/2" 150 lb RF, ANSI B16.5/316L	D 0 5 D 0 6
Flange DN 100 PN 40 Form B1, EN 1092-1/316L Flange DN 100 PN 40 Form B1, EN 1092-1/	C 3 7 C 3 8	Flange 2½" 300 lb RF, ANSI B16.5/316L Flange 3" 150 lb RF, ANSI B16.5/316L	D 0 7 D 0 8
Enamelled <sup>(1)</sup> Flange DN 100 PN 40 Form C, EN 1092-1/316L	C 4 0	Flange 3" 150 lb RF, ANSI B16.5/Hastelloy	D10
Flange DN 100 PN 63 Form B2, EN 1092-1/316L Flange DN 150 PN 16 Form B1, EN 1092-1/316L	C 4 1 C 4 2	Flange 3" 150 lb RF, ANSI B16.5//Monel ZB2977 Flange 3" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 3" 150 lb RF, ANSI B16.5/PFA <sup>6)</sup>	D 1 1 D 1 2 D 1 3
Flange DN 150 PN 16 Form B1, EN 1092-1/PFA <sup>6)</sup> Flange DN 150 PN 40 Form B1, EN 1092-1/316L	C 4 3 C 4 4	Flange 3" 150 lb RF, ANSI B16.5/Enamelled <sup>7)</sup> Flange 3" 150 lb FF, ANSI B16.5/316L	D 1 4 D 1 5
Flange DN 150 PN 40 Form B1, EN 1092-1/ ECTFE <sup>6)</sup>	C 4 5	Flange 3" 150 lb FF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 3" 150 lb FF, ANSI B16.5/PFA <sup>6)</sup>	D 1 6
Flange DN 150 PN 40 Form B2, EN 1092-1/316L	C 4 6	Flange 3" 300 lb RF, ANSI B16.5/316L	D 1 8
Flange 1" 150 lb ANSI B16.5/316L Flange 1"150 lb RF, ANSI B16.5/Hastelloy Flange 1"150 lb RF, ANSI B16.5//Monel ZB2977	C 4 7 C 4 8 C 5 0	Flange 3" 300 lb RF, ANSI B16.5/Hastelloy Flange 3" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	D 2 0 D 2 1
Flange 1" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 1"150 lb RF, ANSI B16.5/PFA <sup>6)</sup>	C 5 1 C 5 2	Flange 3" 300 lb RF, ANSI B16.5/PFA <sup>6)</sup> Flange 3" 300 lb RF, ANSI B16.5/Enamelled <sup>7)</sup>	D 2 2 D 2 3
Flange 1" 150 lb RF, ANSI B16.5/Enamelled <sup>7)</sup> Flange 1" 300 lb RF, ANSI B16.5/316L	C 5 3	Flange 3" 600 lb RF, ANSI B16.5/316L Flange 3½" 150 lb RF, ANSI B16.5/316L Flange 3½" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	D 2 4 D 2 5 D 2 6
Flange 1" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	C 5 5	Flange 4" 150 lb RF, ANSI B16.5/316L	D 2 7
Flange 1" 600 lb RF, ANSI B16.5/316L	C 5 6	Flange 4" 150 lb RF, ANSI B16.5/Hastelloy	D 2 8
Flange 1½" 150 lb RF, ANSI B16.5/316L Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy	C 5 7 C 5 8	Flange 4" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	D 3 0
Flange 1½" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	C 6 0	Flange 4" 150 lb RF, ANSI B16.5/PFA <sup>6)</sup> Flange 4" 150 lb RF, ANSI B16.5/Enamelled <sup>7)</sup>	D 3 1 D 3 2
Flange 1½" 150 lb RF, ANSI B16.5/PFA <sup>6)</sup> Flange 1½" 150 lb RF, ANSI B16.5 Enamelled <sup>7)</sup>	C 6 1	Flange 4" 150 lb LT, ANSI B16.5/316L	D 3 3
Flange 1½" 150 lb FF, ANSI B16.5/ECTFE <sup>6)</sup>	C 6 2 C 6 3	Flange 4" 300 lb RF, ANSI B16.5/316L Flange 4" 300 lb RF, ANSI B16.5/Hastelloy	D 3 4 D 3 5
Flange 1½" 300 lb RF, ANSI B16.5/316L Flange 1½" 300 lb RF, ANSI B16.5//Monel ZB2977 Flange 1½" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	C 6 4 C 6 5 C 6 6	Flange 4" 300 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 4" 300 lb RJF, ANSI B16.5/316L	D 3 6
Flange 1½" 600 lb RF, ANSI B16.5/316L	C 6 7	Flange 4" 300 lb LG, ANSI B16.5/316L Flange 4" 300 lb LT, ANSI B16.5/316L	D 3 8 D 4 0
Flange 2" 150 lb RF, ANSI B16.5/316L Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	C 6 8 C 7 0	Flange 4" 600 lb RF, ANSI B16.5/316L Flange 4" 600 lb RJF, ANSI B16.5/316L	D 4 1 D 4 2
Flange 2" 150 lb RF, ANSI B16.5//Monel ZB2977 Flange 2" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup>	C 7 1 C 7 2	Flange 5" 150 lb RF, ANSI B16.5/316L Flange 6" 150 lb RF, ANSI B16.5/316L	D 4 3
Flange 2" 150 lb RF, ANSI B16.5/PFA <sup>6)</sup>	C 7 3	Flange 6" 150 lb RF, ANSI B16.5/Hastelloy	D 4 5
Flange 2" 150 lb RF, ANSI B16.5/Enamelled (1) Flange 2" 150 lb FF, ANSI B16.5/316L	C 7 4 C 7 5	Flange 6" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 6" 150 lb RF, ANSI B16.5/PFA <sup>6)</sup>	D 4 6 D 4 7
Flange 2" 150 lb FF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 2" 150 lb SG (small groove),	C 7 6 C 7 7	Flange 6" 150 lb RJF, ANSI B16.5/316L Flange 6" 300 lb RF, ANSI B16.5/316L	D 4 8 D 5 0
ANSI B16.5/316L Flange 2" 300 lb RF, ANSI B16.5/316L	C 7 8	Flange 8" 150 lb RF, ANSI B16.5/316L	D 5 1
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 8 0	Flange 8" 150 lb RF, ANSI B16.5/ECTFE <sup>6)</sup> Flange 1" BS.10 Table E/316L	D 5 2 D 5 3

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.	
SITRANS LVL200, Rigid extension	7ML5747-	
Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.		ľ
Flange 1" BS.10 Table E/PFA <sup>6)</sup> Flange 1½" BS.10 Table E/316L Flange 3½" BS.10 Table E/316L	D 5 4 D 5 5 D 5 6	
Flange 4" BS.10 Table E/ECTFE <sup>6)</sup> Flange DN 40 10K, JIS/316L Flange DN 50 10K, JIS/316L	D 5 7 D 5 8 D 6 0	
Flange DN 80 10K, JIS/316L Flange DN 100 10K, JIS/316L	D 6 1 D 6 2	
Adapter/Process temperature		
Without adapter/-50 +150 °C With adapter/-50 +200 °C <sup>8)</sup> With adapter/-50 +250 °C		1 2 3
With gas-tight leadthrough/-50 +150 °C With gas-tight leadthrough/-50 +250 °C		4 5
Housing/ Cable entry		
Aluminium IP66/IP67/M20x1.5 Aluminium IP66/IP67//2" NPT 316L stainless steel (electropolished) IP66/IP67/M20X1.5 <sup>9)10)</sup>		A B C
316L stainless steel (electropolished) IP66/IP67/½" NPT <sup>9)10)</sup>		D
extension coating must match the process connection coating and the material and surface roughness type.		
Rigid Extension 316L		4.0
80 500 mm 501 1 000 mm 1 001 1 500 mm		A 0 A 1 A 2
1 501 2 000 mm 2 001 2 500 mm 2 501 3 000 mm		A 3 A 4 A 5
3 001 3 500 mm 3 501 4 000 mm		A 6 A 7
Rigid Extension ECTFE coated <sup>6)</sup>		
80 500 mm 501 1 000 mm 1 001 1 500 mm		B 0 B 1 B 2
1 501 2 000 mm 2 001 2 500 mm 2 501 3 000 mm		B 3 B 4 B 5
Rigid Extension PFA coated <sup>6)</sup>	_	
80 500 mm 501 1 000 mm 1 001 1 500 mm		C 0 C 1 C 2
1 501 2 000 mm 2 001 2 500 mm 2 501 3 000 mm		C 3 C 4 C 5

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension	7ML5747-
Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	
Rigid Extension 316L Ra ≤ 0.8 μm	
80 500 mm	D 0
501 1 000 mm	D 1
1 001 1 500 mm	D 2
1 501 2 000 mm	D 3
2 001 2 500 mm	D 4
2 501 3 000 mm	D 5
3 001 3 500 mm	D 6
3 501 4 000 mm	D 7
Rigid Extension 316L Ra ≤ 0.3 μm	
80 500 mm	E 0
501 1 000 mm	E 1
1 001 1 500 mm	E 2
1 501 2 000 mm	E 3
2 001 2 500 mm	E 4
2 501 3 000 mm	E 5
3 001 3 500 mm	E 6
3 501 4 000 mm	E 7
Rigid Extension Enamelled version (1)	F 0
251 500 mm 501 750 mm	F 0 F 1 F 2
751 1 000 mm	F 3
1 001 1 250 mm	F 4
1 251 1 500 mm	F 5
Rigid Extension Hastelloy	
80 500 mm	G 0
501 1 000 mm	G 1
1 001 1 500 mm	G 2
1 501 2 000 mm	G 3
2 001 2 500 mm	G 4
2 501 3 000 mm	G 5
3 001 3 500 mm	G 6
3 501 4 000 mm	G 7
Rigid Extension Monel	
80 500 mm	H 0
501 1 000 mm	H 1
1 001 1 500 mm	H 2
1 501 2 000 mm	H 3
2 001 2 500 mm	H 4
2 501 3 000 mm	H 5

- 1) Available with Adapter/Process temperature options 1, 3, 4, and 5 only
- 2) Available with Electronics option 4 only
- $^{3)}$  Available with Adapter/Process temperature options 1 and 3 only
- <sup>4)</sup> Extension length restricted to 2 956 mm
- 5) Available with Housing/Cable entry option B only
- $^{6)}$  Available with Adapter/Process temperature options 1 and 4 only
- $^{7)}$  Available with Adapter/Process temperature options 1, 2, and 4 only
- 8) Available with enamelled Process connection and Extension options only
- $^{9)}$  Available with Approval options A, B, C only
- <sup>10)</sup>Not available with SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)

# Point level measurement - Vibrating switches

SITTANS EVEZUO	
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and silicone free)	W01
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Identification Label (measurement loop) stainless steel: max. 16 characters add in plain text	Y17
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	Y18
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) <sup>1)</sup>	D07
2.2-Factory certificate for material (EN 10204) 1)	C15
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 <sup>1)</sup>	C20
Dye penetration test + 3.1 certificate/instrument <sup>1)</sup>	C13
X-ray test + 3.1 certificate/instrument <sup>1)</sup>	C14
Positive material identification test + 3.1 certificate/instrument <sup>1)</sup>	C16
Roughness test + 3.1 certificate/instrument <sup>1)</sup>	C18
3.1-Inspection Certificate for instrument with test data (EN 10204)	C25
Quality and test plan	C26
Pressure test + 3.1 certificate/instrument <sup>1)</sup>	C31
Helium leak test + 3.1 certificate/instrument <sup>1)</sup>	C32
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument <sup>1)</sup>	C60
Pressure test according to Norsok + 3.1 certificate/instrument <sup>1)</sup>	C61
Additional Operating Instructions	Article No.
LVL200 Extended (DPDT Relay)	
• English	7ML1998-5KW01
• French	7ML1998-5KW11
• Spanish	7ML1998-5KW21
• German	7ML1998-5KW31
LVL200 (Contactless electronic switch)	
• English	7ML1998-5KV01
• French	7ML1998-5KV11
• Spanish	7ML1998-5KV21
German	7ML1998-5KV31
Electronics module LVL200 Relay	
• English	7ML1998-5LS01
• French	7ML1998-5LS11
Spanish	7ML1998-5LS21
<ul> <li>German         This device is shipped with the Siemens Milltronics manual DVD containing the Operating Instructions library.     </li> </ul>	7ML1998-5LS31

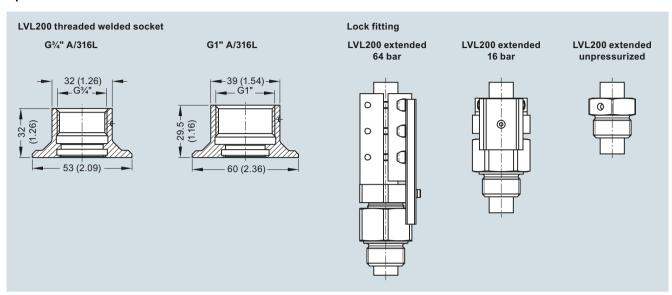
Selection and Ordering data	Article No.
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
Lock fitting, unpressurized, G1" A/316L	7ML1930-1DQ
Lock fitting, unpressurized, 1" NPT/316L	7ML1930-1DR
Lock fitting, unpressurized, G11/2" A/316L	7ML1930-1DS
Lock fitting, unpressurized, 1 1/2" NPT/316L	7ML1930-1DT
Lock fitting, -1 16 bar, G1" A/316L	7ML1930-1DU
Lock fitting, -1 16 bar, 1" NPT/316L	7ML1930-1DV
Lock fitting, -1 16 bar, G1 1/2" A/316L	7ML1930-1DW
Lock fitting, -1 16 bar, 1 1/2" NPT/316L	7ML1930-1DX
Lock fitting, -1 64 bar, G1" A/316L	7ML1930-1EA
Lock fitting, -1 64 bar, 1" NPT/316L	7ML1930-1EB
Lock fitting, -1 64 bar, G1 1/2" A/316L	7ML1930-1EC
Lock fitting, -1 64 bar, 1 1/2" NPT/316L	7ML1930-1ED

<sup>1)</sup> Listed Certificates are not available with all configurations, please contact factory for more information

Point level measurement - Vibrating switches

# SITRANS LVL200

# Options

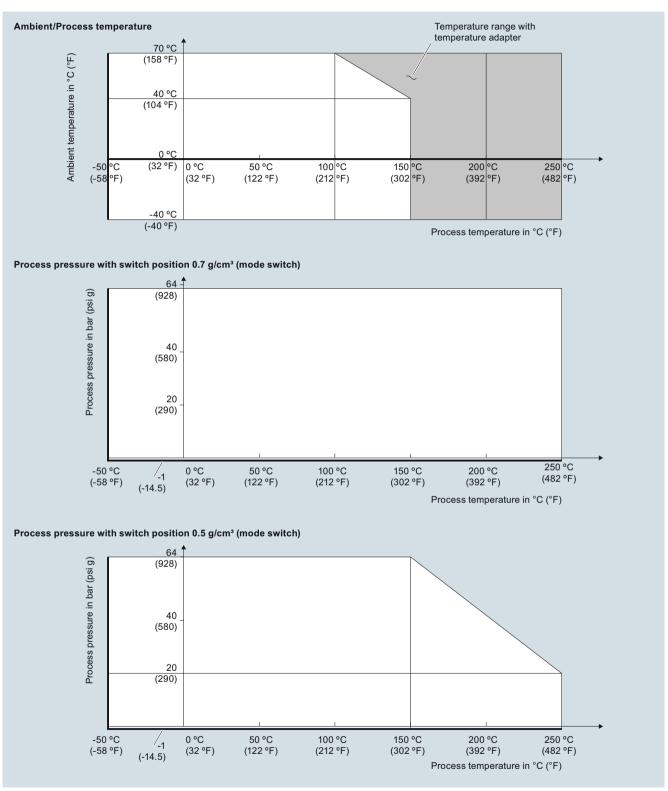


SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

Point level measurement - Vibrating switches

### **SITRANS LVL200**

### Characteristic curves

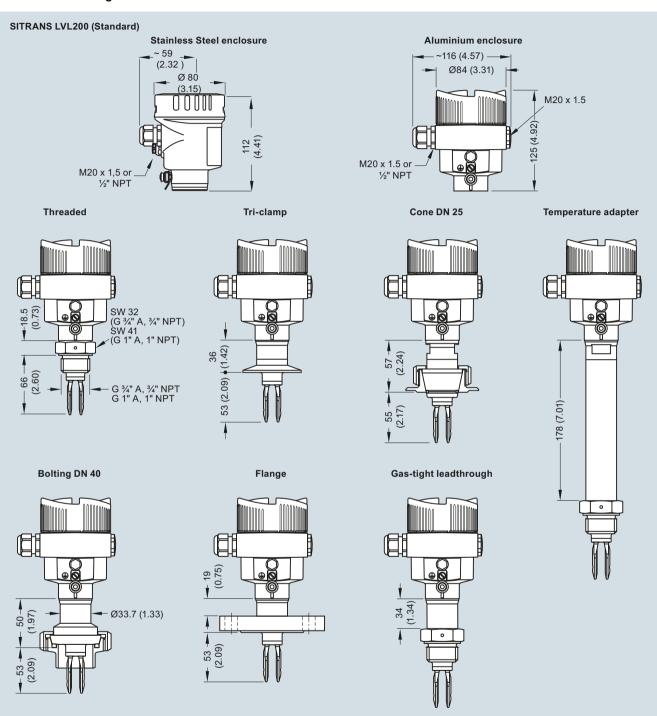


SITRANS LVL200 Process Pressure/Process Temperature/Ambient Temperature derating curves

Point level measurement - Vibrating switches

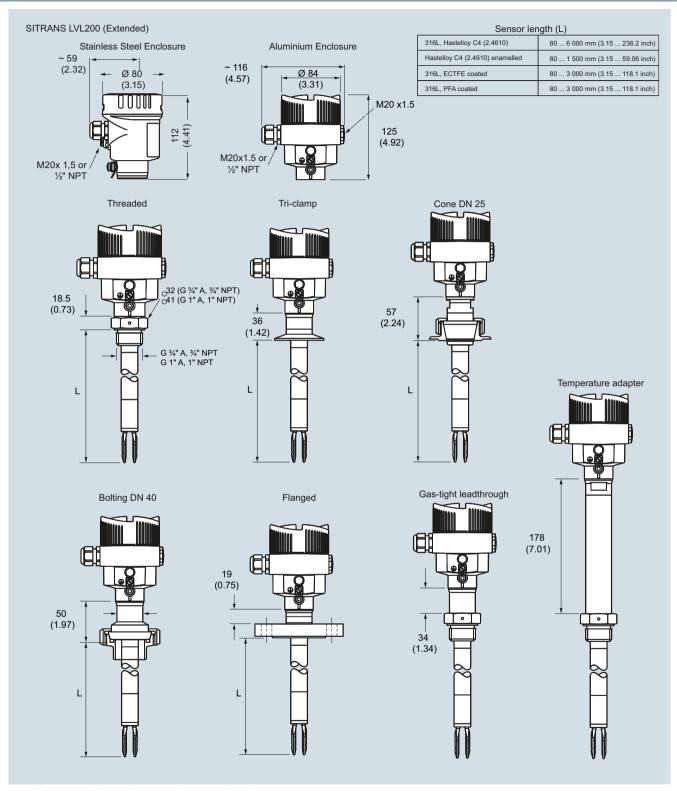
SITRANS LVL200

# Dimensional drawings



SITRANS LVL200 (Standard), dimensions in mm (inch)

Point level measurement - Vibrating switches

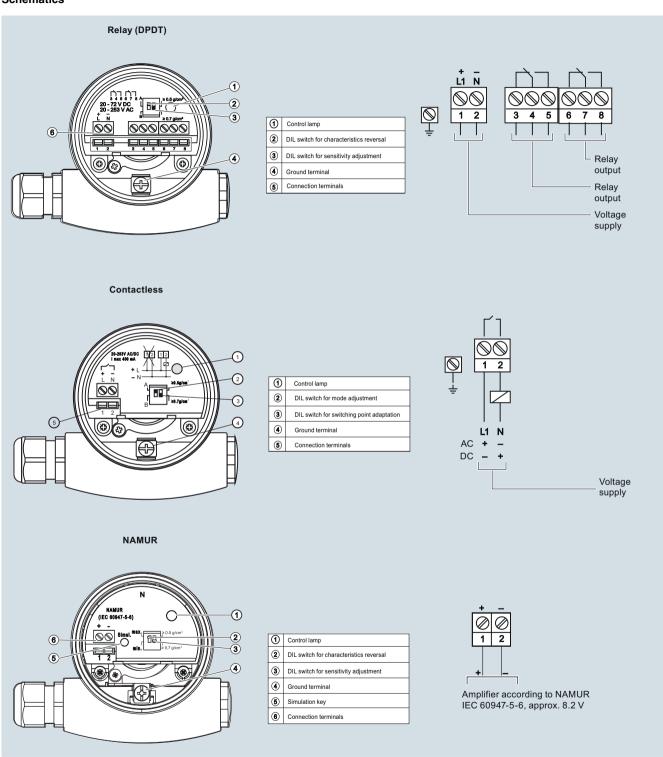


SITRANS LVL200 (Extended), dimensions in mm (inch)

Point level measurement - Vibrating switches

SITRANS LVL200

# Schematics



SITRANS LVL200 connections

Point level measurement - Vibrating switches

### **SITRANS LVS100**

### Overview



SITRANS LVS100 is a vibrating point level switch for material detection in bulk solids.

### Benefits

- High resistance to mechanical forces
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 30 g/l (1.9 lb/ft<sup>3</sup>)
- Customer desired extensions up to 4 000 mm (157.48 inch)

### Application

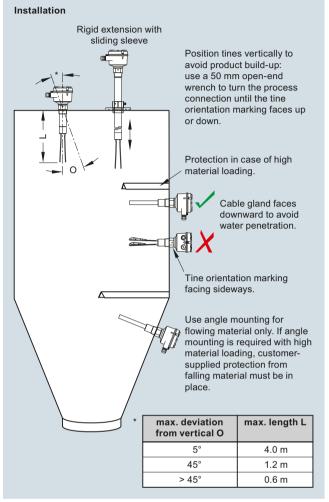
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

• Key Applications: dry bulk solids in bins, silos, hoppers

# Configuration



SITRANS LVS100 installation, dimensions in mm (inch)

# Point level measurement - Vibrating switches

# SITRANS LVS100

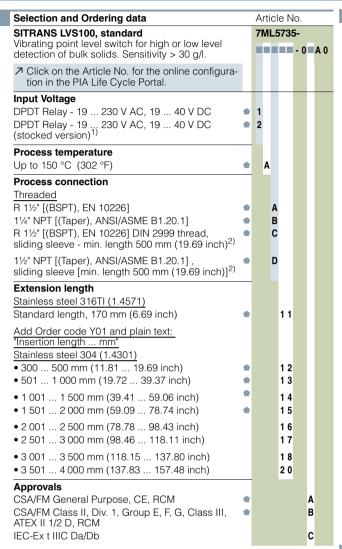
# Technical specifications

Measuring principle	Vibrating point level switch	
Input		
Measured variable	High, low and demand	
Measuring frequency	200 Hz	
Output		
Relays	DPDT relay	
Relay delay	From loss of vibration: approximately 1 second	
	From resumption of vibration: approximately 1 2 s	
Signal delay	Probe uncovered to covered: approximately 1 s	
	Probe covered to uncovered: approximately 1 2 s	
Relay fail-safe	High or low, switch selectable	
Alarm output	Relay 8 A at 250 V AC, non-inductive	
	Relay 5 A at 30 V DC, non-inductive	
Sensitivity	High or low, switch selectable	
Rated operating conditions		
Installation conditions • Location	Indoor/outdoor	
Ambient conditions  Ambient temperature  Installation category  Pollution degree	-40 +60 °C (-40 +140 °F) III 2	
Medium conditions  • Process temperature  • Max. threaded bushing temperature  • Max. enclosure surface temperature	,	
<ul> <li>(Category 2D)</li> <li>Max. extension surface temperature</li> </ul>		
Max. extension surface temperature (Category 1D)     Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1	

Design	
Material • Enclosure	Epoxy coated aluminum
Eliciosure	Epoxy coated aluminum
Process connection	Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226] Thread R 1½" [(BSPT), EN 1026], EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] Thread material: stainless steel 304 (1.4301) or 316TI (1.4571) depending on configuration
Tine material	Stainless steel 316TI (1.4571)
Degree of protection	IP66/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x 1/2" NPT
Weight	Standard version, no extensions: approx. 1.7 kg (3.7 lb)
Power supply	• 19 230 V AC, +10 %, 50 60 Hz, 8 VA • 19 40 V DC, +10 %, 1.5 W
Certificates and approvals	CSA/FM General Purpose CE CSA/FM Dust Ignition Proof RCM ATEX II 1/2 D IECex

### Point level measurement - Vibrating switches

### **SITRANS LVS100**

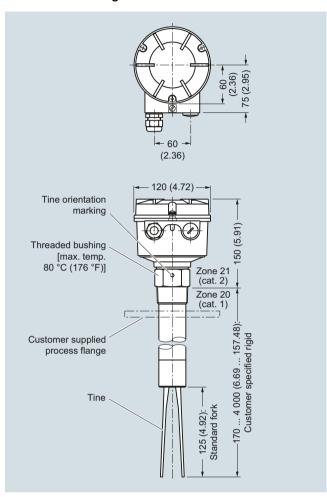


- Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0
- <sup>2)</sup> Not available with extension length options 11, 12
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. (50 mm increments)	Y01
Signal bulb inserted in M20 cable gland 1)	A20
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FT63
Spare Parts	
Replacement Electronics Module LVS100 DPDT Relay (19 253 V AC, 19 55 V DC)	7ML1830-1NS
R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve	7ML1830-1NT
1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]	7ML1830-1NU

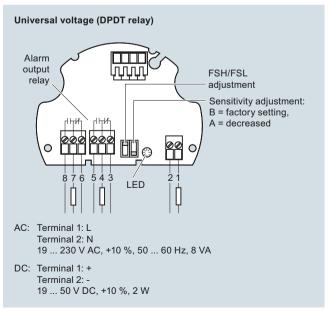
<sup>1)</sup> Available only with approval CE

### Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

### Schematics



SITRANS LVS100 connections

Point level measurement - Vibrating switches

SITRANS LVS200

### Overview



SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

### Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft<sup>3</sup>); liquid/solid interface version, 50 g/l (3 lb/ft<sup>3</sup>) and low density option min. 5 g/l (0.3 lb/ft<sup>3</sup>)
- Customer desired extensions up to 20 000 mm (787 inch)
- · Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) insertion length

# Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1 inch pipe.

SITRANS LVS200 has an optional 4 ... 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

 Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

Medium conditions

# **Level Measurement**

# Point level measurement - Vibrating switches

# SITRANS LVS200

# Technical specifications

Mode of operation	
Measuring principle	Vibrating point level switch
Input	3.
Measured variable	High, low and demand
Measuring frequency Standard Liquid/solid interface and short fork version	125 Hz 350 Hz
Output	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)
2-wire without contact	Load current: • Min. 10 mA • Max. 500 mA permanent • Max. 2A < 200 ms • Max. 5A < 50 ms
	Voltage drop on the electronic mod- ule: max. 7 V with closed electric circuit
	Cut-off current with open electric circuit: max. 5 mA
Relays	
<ul><li>Version with 1 relay</li><li>Version with 2 relays</li></ul>	SPDT relay DPDT relay
Relay delay	<ul> <li>From loss of vibration: approximately 1 second</li> <li>From resumption of vibration: approximately 1 2 seconds</li> </ul>
Signal delay	Probe uncovered to covered: approximately 1 second Probe covered to uncovered: approximately 1 2 seconds
Relay fail-safe	High or low, switch selectable
Alarm output	Relay 8 A at 250 V AC, non-inductive     Relay 5 A at 30 V DC, non-inductive
mA output • Resolution	8/16 mA or 4 20 mA 4 20 mA ± 0.1 mA
Sensitivity	High or low, switch selectable
Rated operating conditions	
Installation conditions • Location	Indoor/outdoor
Ambient conditions  • Ambient temperature  • Installation category  • Pollution degree	-40 +60 °C (-40 +140 °F) III 2

Process temperature	<ul> <li>All except CSA Class II, Group G:         -40 +150 °C (-40 +302 °F)</li> <li>CSA Class II, Group G:         -40 +140 °C (-40 +284 °F),         CSA temperature code T3B</li> </ul>
Max. threaded bushing temperature     Max. enclosure surface temperature (Category 2D)	60 °C (140 °F)
Max. extension surface temperature (Category 1D)	150 °C (302 °F)
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1
Minimum material density	<ul> <li>Standard version: approx. 20 g/l (1.2 lb/ft<sup>3</sup>)</li> <li>Liquid/solid interface version: approx. 50 g/l (3 lb/ft<sup>3</sup>)</li> <li>Optional low density version: approx. 5 g/l (0.3 lb/ft<sup>3</sup>)</li> </ul>
Design	
Material • Enclosure	Epoxy coated aluminum
Process connection	Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226] and flange options Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread Thread material: stainless steel 303 (1.4301)
Tine material	Stainless steel 316Tl (1.4571), PTFE-coated tines are available upon special request
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x 1/2" NPT
Weight	Standard version, no extensions: approx. 2.0 kg (4.4 lb)     Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb)
Power supply	• 19 230 V AC, +10 %, 50 60 Hz, 8 VA • 19 55 V DC, +10 %, 1.5 W
Certificates and approvals	CSA/FM General Purpose CE CSA/FM Dust Ignition Proof RCM ATEX II 1/2 D CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, available only with power supply option 5 and 6 ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5

# Point level measurement - Vibrating switches

Selection and Ordering data		Art	icle	e N	0.	
SITRANS LVS200, standard		7M	L5	731	l <b>-</b>	
SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.		ľ		-	-	A 0
\         \times Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Power supply 19 230 V AC, 19 55 V DC, one relay output (SPDT) <sup>1)</sup>	•	1				
19 230 V AC, 19 55 V DC, two relay outputs (DPDT) <sup>1)</sup>		2				
18 50 V DC PNP <sup>1)</sup>		3				
19 230 V AC/DC without contact, 2-wire loop powered 1) 7 9 V DC (requires NAMUR switch amplifier)		5				
NAMUR IEC 60947-5-6, 2-wire <sup>2)</sup> 8/16 mA or 4 20 mA; 12.5 35 V DC, 2-wire <sup>3)</sup>		6				
19 230 V AC, 19 55 V DC, one relay output (SPDT) basic version <sup>4)5)</sup>	<b>&gt;</b>	7				
Process temperature						
Without temperature isolator With temperature isolator Separated enclosure - cable length 1.5 m (4.92 ft)	<b>&gt;</b>	E C				
[max. temperature process 150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]						
Separated enclosure - cable length 4.0 m (13.12 fmax. temperature process150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]	ft)	C	)			
Process connection						
Threaded						
R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)] <sup>6)</sup>	<b>&gt;</b> •		A B C			
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] <sup>6)</sup> Flanged			D			
DN 100 PN 6, EN 1092-1 <sup>7)</sup> DN 100 PN 16, EN 1092-1			E F			
2" ASME 150 lb B16.5 3" ASME 150 lb B16.5			G H			
4" ASME 150 lb B16.5 2" Tri-clamp (DN 50) ISO 2852			J K			
Extension length			_			
Stainless steel 304 (1.4301)	<b>&gt;</b>			11		
Add Order code Y01 and plain text: "Insertion length mm"						
• 300 500 mm (11.81 19.69 inch)	•			12		
• 501 750 mm (19.72 29.53 inch) • 751 1 000 mm (29.57 39.37 inch)	•			13 14		
• 1 001 1 250 mm (39.41 49.21 inch)	•			1 5		
• 1 251 1 500 mm (49.25 59.06 inch) • 1 501 1 750 mm (59.09 68.90 inch)	•			1 6 1 7		
• 1 751 2 000 mm (68.94 78.74 inch)	•			18		
• 2 001 2 250 mm (78.78 88.58 inch) • 2 251 2 500 mm (88.62 98.43 inch)	•			2 1 2 2		
• 2 501 2 750 mm (98.46 108.27 inch)	•			23		
• 2 751 3 000 mm (108.31 118.11 inch) • 3 001 3 250 mm (118.15 127.95 inch)	•			2 4 2 5		
• 3 251 3 500 mm (127.99 137.80 inch)	•			2 6		
• 3 501 3 750 mm (137.83 147.64 inch) • 3 751 4 000 mm (147.68 157.48 inch)	•			2 7 2 8		

			_
Selection and Ordering data	Article		
SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch	7ML57		
for high, low, or demand level detection of bulk solids.			1
Stainless steel 316L (1.4404) Standard length, 235 mm (9.25 inch)	3	3 1	
Add Order code Y01 and plain text: "Insertion length mm"			
300 500 mm (11.81 19.69 inch)		3 2	
501 750 mm (19.72 29.53 inch) 751 1 000 mm (29.57 39.37 inch)		3 3 3 4	
1 001 1 250 mm (39.41 49.21 inch)	3	3 5	
1 251 1 500 mm (49.25 59.06 inch) 1 501 1 750 mm (59.09 68.90 inch)		3 6 3 7	
1 751 2 000 mm (68.94 78.74 inch)		3 8	
2 001 2 250 mm (78.78 88.58 inch)		11	
2 251 2 500 mm (88.62 98.43 inch) 2 501 2 750 mm (98.46 108.27 inch)		l 2 l 3	
2 751 3 000 mm (108.31 118.11 inch)		14	
3 001 3 250 mm (118.15 127.95 inch)		l 5 l 6	
3 251 3 500 mm (127.99 137.80 inch) 3 501 3 750 mm (137.83 147.64 inch)		17	
3 751 4 000 mm (147.68 157.48 inch)		1 8	
Material process connection/extension			
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) <sup>8)</sup>	•	1	
Stainless steel 316L (1.4404) <sup>9)</sup>		2	
Approvals CSA/FM Dust Ignition Proof, RCM ▶		A	
	•	В	
CSA/FM General Purpose, RCM CE, RCM		C	
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1,		E	
Ex ia IIC, RCM ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and		F	
1/2D, RCM IEC-Ex t IIIC Da/Db		G	
1) Available with Assessed autions A. B. C. arki		u	•

- 1) Available with Approval options A ... D, G only
- 2) Available with Approval options D, E, F only
- 3) Available with Approval options B, D, G only
- Available with configurations 7ML5731-7AA11-1BA0 or 7ML5731-7AB11-1AA0 only
- 5) Basic version is cost effective and offers fast delivery
- $^{6)}$  Not available with extension length options 11, 12, 31, 32
- 7) Max. 6 bar (87 psi)
- 8) Available with option extension length 11 ... 28
- $^{9)}$  Available with option extension length 31  $\dots$  48
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- Available ex stock. For details see page 9/5 in the appendix.

# Point level measurement - Vibrating switches

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity $> 5$ g/l via electronics and increased insertion length of 25 mm (0.98 inch) <sup>3)</sup>	K05
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch), and increased aluminum fork width 1)3)	G01
Signal bulb inserted in M20 cable gland <sup>2)</sup>	A20
NAMUR 8/16 mA switch amplifiers available, contact factory for pricing	
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FT63
Spare Parts	
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, two relay output (DPDT)]	A5E35525363
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN
Namur Isolator switch amplifier relay output KFD2-SR2-Ex1.W	A5E03496569
Available ex stock	
For details see page 9/5 in the appendix.	
SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/ extension 1, and approval B	7ML5731- 7AA11-1BA0
SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/ extension 1, and approval A	7ML5731- 7AB11-1AA0
1) Available only with power supply 1 and Approval C. D.	and with

 $<sup>^{1)}</sup>$  Available only with power supply 1 and Approval C, D and with Process connection flange E  $\dots$  J

Selection and Ordering data		Arti	cle N	lo.	
SITRANS LVS200, short fork for liquids/		7MI	_5732	2-	
solids interface Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements		•	-	ľ	A 0
\[         \times \text{Click on the Article No. for the online configuration in the PIA Life Cycle Portal.}         \]					
Power supply 19 230 V AC, 19 55 V DC, one relay output (SPDT)	•	1			
19 230 V AC, 19 55 V DC, two relay outputs (DPDT)		2			
18 50 V DC PNP 19 230 V AC/DC without contact, 2-wire loop powered 8/16 mA or 4 20 mA; 12.5 35 V DC, 2-wire <sup>1)</sup>		3 4 5			
Process temperature					
Without temperature isolator	•	Α			
With temperature isolator		В			
Separated enclosure - cable length 1.5 m (4.92 ft)		C			
[max. temperature process 150 °C (302 °F)/					
max. temperature electronics 60 °C (140 °F)]					
Separated enclosure - cable length 4.0 m (13.12 ft)		D			
[max. temperature process 150 °C (302 °F)/					
max. temperature electronics 60 °C (140 °F)]					
Process connection					
Threaded					
R 1½" [(BSPT), EN 10226]	•		A		
1½" NPT [(Taper), ANSI/ASME B1.20.1] G 2" [(BSPP), EN ISO 228-1], sliding sleeve	_		B C		
[min. length 500 mm (19.69 inch)] <sup>2)</sup>			C		
2" NPT [(Taper), ANSI/ASME B1.20.1],			D		
sliding sleeve [min. length 500 mm (19.69 inch)] <sup>2)</sup>					
Flanged					
DN 100 PN 6, EN 1092-1 <sup>3)</sup>			E		
DN 100 PN 16, EN 1092-1			F		
2" ASME 150 lb B16.5			G		
3" ASME 150 lb B16.5			H		
4" ASME 150 lb B16.5			J		
2" Tri-clamp (DN 50) ISO 2852			K		
Extension length Stainless steel 304 (1.4301)					
Standard length, 165 mm (6.50 inch)			11		
	_		· '		
Add Order code Y01 and plain text:					
"Insertion length mm" 200 500 mm (7.87 19.69 inch)			1 2		
501 750 mm (19.72 29.53 inch)	-		13		
751 1 000 mm (29.57 39.37 inch)	-		1 4		
·	Ī				
1 001 1 250 mm (39.41 49.21 inch)	•		15		
1 251 1 500 mm (49.25 59.06 inch)	-		16		
1 501 1 750 mm (59.09 68.90 inch)	•		1 7		
1 751 2 000 mm (68.94 78.74 inch)	•		1 8		
2 001 2 250 mm (78.78 88.58 inch)	•		2 1		
2 251 2 500 mm (88.62 98.43 inch)			2 2		
2 501 2 750 mm (98.46 108.27 inch)	•		2 3		
2 751 3 000 mm (108.31 118.11 inch)	•		2 4		
3 001 3 250 mm (118.15 127.95 inch)	•		2 5		
3 251 3 500 mm (127.99 137.80 inch)	•		2 6		
3 501 3 750 mm (137.83 147.64 inch)	•		27		
3 751 4 000 mm (147.68 157.48 inch)	•		2 8		
,					

<sup>2)</sup> Available with Approval option D only

<sup>3)</sup> K05 and G01 are not available together

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.
SITRANS LVS200, short fork for liquids/	7ML5732-
solids interface Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	A 0
Stainless steel 316L (1.4404) Standard length, 165 mm (6.50 inch) Add Order code Y01 and plain text: "Insertion length mm"	3 1
200 500 mm (7.87 19.69 inch) 501 750 mm (19.72 29.53 inch) 751 1 000 mm (29.57 39.37 inch)	3 2 3 3 3 4
1 001 1 250 mm (39.41 49.21 inch) 1 251 1 500 mm (49.25 59.06 inch) 1 501 1 750 mm (59.09 68.90 inch) 1 751 2 000 mm (68.94 78.74 inch)	35 36 37 38
2 001 2 250 mm (78.78 88.58 inch) 2 251 2 500 mm (88.62 98.43 inch) 2 501 2 750 mm (98.46 108.27 inch)	4 1 4 2 4 3
2 751 3 000 mm (108.31 118.11 inch) 3 001 3 250 mm (118.15 127.95 inch) 3 251 3 500 mm (127.99 137.80 inch)	4 4 4 5 4 6
3 501 3 750 mm (137.83 147.64 inch) 3 751 4 000 mm (147.68 157.48 inch)	4 7 4 8
Material process connection/extension Stainless steel threads 304 (1.4301), flanges 321(1.4541), Tri-clamp 304 (1.4301) <sup>4)</sup> Stainless steel 316L (1.4404) <sup>5)</sup>	1 2
Approvals	
CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM	A B C
CE, RCM IEC-Ex t IIIC Da/Db	D E

1)	Available	with	Approval	option	В,	D,	Е	only
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<sup>2)</sup> Not available with extension length options 11,12, 31, 32

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (147.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Signal bulb inserted in M20 cable gland <sup>1)</sup>	A20
Adjustable sensitivity (by potentiometer) for solids/ liquids interface detection <sup>1)2)</sup>	G02
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FT63
Spare Parts	
Replacement Electronics Module (350 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN

<sup>1)</sup> Available with Approval option D only

<sup>3)</sup> Max. 6 bar (87psi)

<sup>4)</sup> Available with option extension length 11 ... 28

<sup>5)</sup> Available with option extension length 31 ... 48

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

<sup>2)</sup> Available with power supply option 1 only

# Point level measurement - Vibrating switches

Calcation and Ordering date	Autiala Na
Selection and Ordering data	Article No.
SITRANS LVS200, pipe extension Vibrating point level switch for high or low levels of bulk solids Extended using 1" pipe extension (customer supplied)	7ML5733-
Power supply	
19 230 V AC, 19 55 V DC, one relay output (SPDT) <sup>1)</sup>	1
19 230 V AC, 19 55 V DC, two relay outputs (DPDT) <sup>1)</sup>	2
18 50 V DC PNP <sup>1)</sup> 19 230 V AC/DC without contact, 2-wire loop	3 4
powered <sup>1)</sup> 7 9 V DC (requires NAMUR switch amplifier)	5
NAMUR IEC 60947-5-6, 2-wire <sup>2)</sup> 8/16 mA or 4 20 mA; 12.5 35 V DC, 2-wire <sup>3)</sup>	6
Process temperature Up to 150 °C (302 °F)	А
Process connection	
Threaded R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1]	A B
Flanged	
DN 100 PN 6, EN 1092-1 <sup>4)</sup> DN 100 PN 16, EN 1092-1	C
2" ASME 150 lb B16.5 3" ASME 150 lb B16.5 4" ASME 150 lb B16.5 2" Tri-clamp (DN 50) ISO 2852	E F G K
Process connection material	
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) Stainless steel 316L (1.4404)	1 2
Extension length	
Customer supplied 1" pipe extension Length: 300 3 800 mm (11.81 149.61 inch)	1
Application type	
Dry bulk solids (125 Hz) Liquids/solids interface (350 Hz)	1 2
Approvals	
CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM	A B
CSA/FM General Purpose, RCM	C
CE, RCM CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, RCM	D E
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM	F
IEC-Ex t IIIC Da/Db	H

1)	Available	with	Approval	options	Α,	В,	С,	D,	G on	ly
----	-----------	------	----------	---------	----	----	----	----	------	----

Available with Approval options D, E and F only. Not available for application type 2 "Liquids/solids interface".

Selection and Ordering data	Order code
Further Designs	Order code
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 3 800 mm (149.61 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) <sup>5)</sup>	K05
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width 1)4)5)	G01
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection <sup>2)3)4)</sup>	G02
Signal bulb inserted in M20 cable gland <sup>2)</sup>	A20
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FT63
Spare Parts	
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Isolated switch amplifier relay output KFD2-SR2-Ex1.W	A5E03496569

 $<sup>^{1)}</sup>$  Available only with power supply 1 and Approvals C, D and with Process connection flange C  $\dots$  G

<sup>3)</sup> Available with Approval options B, D, G only

<sup>4)</sup> Max. 6 bar (87 psi)

<sup>&</sup>lt;sup>2)</sup> Available with approval options D only

 $<sup>^{3)}</sup>$  Available with power supply option 1 only and application type 2

<sup>4)</sup> Not available with option K05

<sup>5)</sup> Available with Application type 1 only

# Point level measurement - Vibrating switches

Selection and Ordering data	Article No.
SITRANS LVS200, cable extended	7ML5734-
Vibrating point level switch for high or low level detection of bulk solids materials	A (
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 230 V AC, 19 55 V DC, one relay output (SPDT) <sup>1)</sup>	1
19 230 V AC, 19 55 V DC, two relay outputs (DPDT) <sup>1)</sup>	2
18 50 V DC PNP <sup>1)</sup> 19 230 V AC/DC without contact,	3
2-wire loop powered <sup>1)</sup>	
7 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire <sup>2)</sup>	5
8/16 mA or 4 20 mA; 12.5 35 V DC, 2-wire <sup>3)</sup>	6
Process temperature Up to 80 °C (176 °F)	A
Process connection	
Threaded  P. 11/4" [(PSPT) EN 10226] (1, 4201/204)	
R 1½" [(BSPT), EN 10226] (1.4301/304) 1½" NPT [(Taper), ANSI/ASME B1.20.1] (1.4301/304)	A B
Flanged	
DN 100 PN 6, EN 1092-1 (1.4541/321) <sup>4)</sup> DN 100 PN 16, EN 1092-1 (1.4541/321)	C D
2" ASME 150 lb B16.5 (1.4541/321)	E
3" ASME 150 lb B16.5 (1.4541/321) 4" ASME 150 lb B16.5 (1.4541/321)	F G
Extension length	
750 1 000 mm (29.5 39.4 inch) [max. length 20 000 mm (787.4 inch), not with Power supply option 5 (max. 10 000 mm, 393.7 inch)]	1 0
Add Order code Y01 and plain text:	
"Insertion length mm" 1 001 2 000 mm (39.41 78.74 inch)	11
2 001 3 000 mm (78.78 118.11 inch)	1 2
3 001 4 000 mm (118.15 157.48 inch)	1 3
4 001 5 000 mm (157.52 196.85 inch)	14
5 001 6 000 mm (196.89 236.22 inch) 6 001 7 000 mm (236.26 275.59 inch)	1 5 1 6
7 001 8 000 mm (275.63 314.96 inch) <sup>5)</sup>	1 7
3 001 9 000 mm (315 354.33 inch) <sup>5)</sup> 9 001 10 000 mm (354.37 393.70 inch) <sup>5)</sup>	1 8 2 0
10 001 11000 mm (393.74 433.07 inch) <sup>5)6)</sup>	2 1
11 001 12 000 mm (433.11 472.44 inch) <sup>5)6)</sup> 12 001 13 000 mm (472.48 511.81 inch) <sup>5)6)</sup>	2 2 2 3
13 001 14 000 mm (511.85 551.18 inch) <sup>5)6)</sup>	2 4
14 001 15 000 mm (551.22 590.55 inch) <sup>5)6)</sup> 15 001 16 000 mm (590.59 629.92 inch) <sup>5)6)</sup>	2 5 2 6
16 001 17 000 mm (629.96 669.29 inch) <sup>5)6)</sup>	2 7
17 001 18 000 mm (669.33 708.66 inch) <sup>5)6)</sup> 18 001 19 000 mm (708.70 748.03 inch) <sup>5)6)</sup>	28
19 001 19 000 mm (708.70 748.03 linch) <sup>576</sup>	31
Application type	
Dry bulk solids (125 Hz)	1
Liquid/solids interface (350 Hz) <sup>7)</sup>	2

Selection and Ordering data	Article No.
SITRANS LVS200, cable extended	7ML5734-
Vibrating point level switch for high or low level detection of bulk solids materials	A 0
Approvals	
CSA/FM Dust Ignition Proof, RCM	A
ATEX II 1/2 D, RCM	В
CSA/FM General Purpose, RCM	С
CE, RCM	D
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, RCM	E
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM <sup>6)</sup>	F
IEC-Ex t IIIC Da/Db	G

- 1) Available with Approval options A, B, C, D, G only
- Available with Approval option D, E and F only.
   Not available for application type 2 "Liquids/solids interface".
- 3) Available with Approval option D only
- 4) Max. 6 bar (87 psi)
- 5) Not available with application type option 2
- 6) Not available with Power supply option 5
- 7) Cable length is limited to 7 000 mm (275.59 inch).

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 20 000 mm (787.40 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)	K05
Enhanced sensitivity < 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width <sup>1)</sup>	G01
Signal bulb inserted in M20 cable gland <sup>2)</sup>	A20
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FT63
Spare Parts	
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 230 V AC, 19 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 230 V AC, 19 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Isolated switch amplifier relay output KFD2-SR2-Ex1.W	A5E03496569

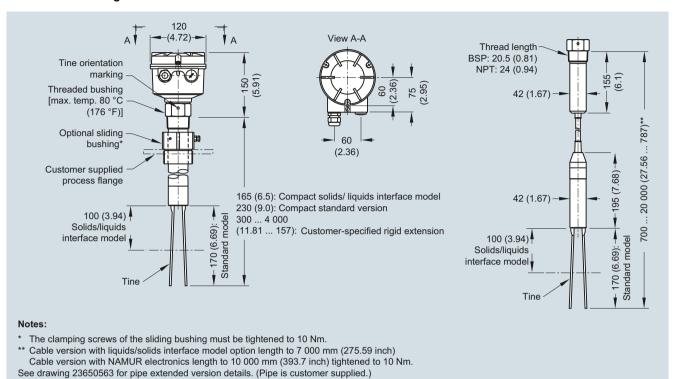
 $<sup>^{1)}</sup>$  Available only with power supply 1 and Approvals C, D and with process connection flange C  $\dots$  G

<sup>&</sup>lt;sup>2)</sup> Available with Approval options C and D only

Point level measurement - Vibrating switches

# **SITRANS LVS200**

# Dimensional drawings

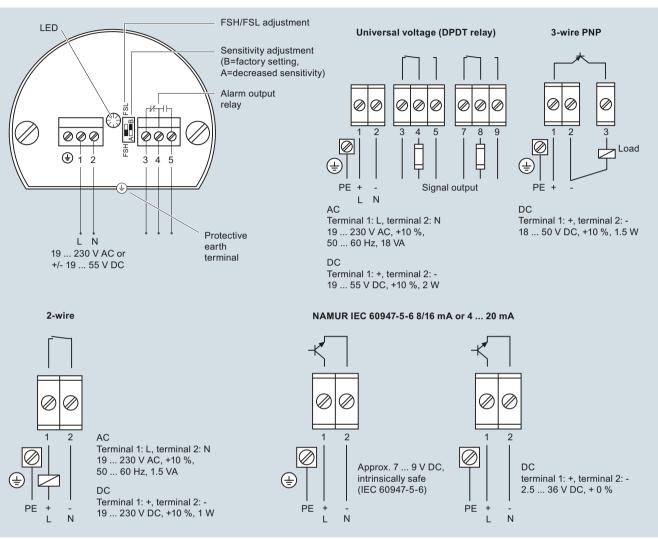


SITRANS LVS200, dimensions in mm (inch)

Point level measurement - Vibrating switches

# SITRANS LVS200

# Schematics

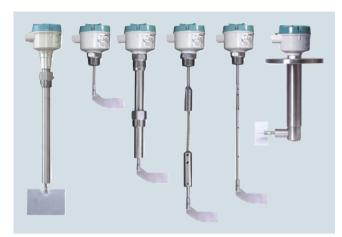


SITRANS LVS200 connections

Point level measurement - Rotation paddle switches

### **SITRANS LPS200**

### Overview



SITRANS LPS200 is a rotary paddle switch for point level and material detection in bulk solids.

### Benefits

- Proven paddle switch technology for bulk solids
- · High integrity mechanical seal
- Optional switch selectable power supply
- Unique friction clutch mechanism prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation

### Application

The paddle switch technology detects full, empty, or demand conditions on materials such as grain, feed, cement, plastic granulate, and wood chips. The paddle switch can handle bulk densities as low as 15 g/l (2.19 lb/ft<sup>3</sup>) with the optional rectangular vane or 100 g/l (6.25 lb/ft<sup>3</sup>) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

 Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

### Technical specifications

recnnical specifications	
Mode of operation	
Measuring principle	Rotating point level switch
Input	
Measured variable	High and low and demand
Output	
Output signal • Alarm output	Microswitch 5 A at 250 V AC, non inductive
• Pickup delay	Microswitch SPDT contact 4 A at 30 V DC, non-inductive Standard (1 rpm model): approx. 1.3 seconds
	Optional process applications (5 rpm model): approx. 0.26 seconds
Sensitivity	Adjustable via reset force of spring or geometry of measuring vane
Rated operating conditions	
Installation conditions  Location	Indoor/outdoor
Ambient conditions  Ambient temperature  Installation category  Pollution degree	-25 +60 °C (-13 +140 °F) III 2
Medium conditions  Temperature Standard Optional	Bulk solids -25 +80 °C (-13 +176 °F) -25 +600 °C (-13 +1 112 °F)
<ul> <li>Pressure (vessel)</li> <li>Standard</li> <li>Optional</li> <li>Minimum material density</li> <li>Standard measuring vane</li> <li>Optional measuring vane</li> </ul>	Higher temperature version available. Contact PVC for pricing.  Max. 0.5 bar g (7.25 psi g)  Max. 10 bar g (145 psi g)  • Can detect down to 100 g/l (6.25 lb/ft <sup>3</sup> )  • Can detect down to 15 g/l (2.19 lb/ft <sup>3</sup> )
Design	
Material  Enclosure  Process connection, measuring shaft and vane	Epoxy coated aluminum Stainless steel or aluminum
Process connection	Thread NPT, BSP, and flange options
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	$2 \times M20 x 1.5$ or $2 \times 1/2"$ NPT
Power supply	
Jumper selectable	$115~V~AC, \pm~15~\%, 50~~60~Hz, 4~VA\\ or~230~V~AC, \pm~15~\%, 50~Hz, 6~VA, or\\ 48~V~AC, or~24~V~AC\\ or~24~V~DC, \pm~15~\%, 2.5~W$
Universal voltage (DPDT replay)	24 V DC ± 15 % 50 60 Hz, 22 230 V, ± 10 %, max. 10 VA
Certificates and approvals	<ul><li>CSA/FM General Purpose</li><li>CE</li><li>CSA/FM Dust Ignition Proof</li></ul>

• ATEX II 1/2 D

RCM

• IECex

# Point level measurement - Rotation paddle switches

		_					_			
Selection and Ordering data SITRANS LPS200, compact		_			No.	. (	)rc	l. (	COC	ie
Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications.			-		- 1		0	)		
Click on the Article No. for the online con figuration in the PIA Life Cycle Portal.	-									
Process temperature Up to 80 °C (176 °F)	•	1								
Up to 150 °C (302 °F) Up to 250 °C (482 °F)		2								
Up to 600 °C (1 112 °F) <sup>1)2)</sup> Up to 80 °C (176 °F) basic version	<b>&gt;</b>	4 5								
aluminum <sup>3)</sup> Up to 80 °C (176 °F) basic version stainless steel <sup>4)</sup>	<b>&gt;</b>	6								
Power supply 230 V AC, 1 rev/min.	<b>&gt;</b>		A							
230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min.	•		B C							
230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe	<b>&gt;</b>		D E F							
115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe	•		G H							
48 V AC, 1 rev/min. 24 V AC, 1 rev/min.	•		J K							
24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe	•		L M							
24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe	•		N P							
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC	•		Q R							
multi-voltage, 5 rev/min. 48 V AC, 1 rev/min., fail-safe			z						J 1	Α
48 V AC, 5 rev/min. 48 V AC, 5 rev/min., fail-safe			Z Z						J 1 J 1	
24 V AC, 1 rev/min., fail-safe 24 V AC, 5 rev/min.			z z						J 1	D
24 V AC, 5 rev/min., fail-safe			Z						J 1	
Universal Voltage, 1 rev/min. (13) Universal Voltage, 1 rev/min, fail-safe (13)			Z Z						J 2	
Universal Voltage, 5 rev/min. <sup>13)</sup>			z						J 2	
Universal Voltage, 5 rev/min, fail-safe <sup>13)</sup>			Z						J 2	D
Process connection Threaded										
G 1¼" [(BSPP), EN ISO 228-1]	•			A						
G 1" [(BSPP), EN ISO 228-1] G 1½" [(BSPP), EN ISO 228-1]	<b>&gt;</b>			B C						
1" NPT [(Taper), ANSI/ASME B1.20.1]	•			D						
11/4" NPT [(Taper), ANSI/ASME B1.20.1] 11/2" NPT [(Taper), ANSI/ASME B1.20.1]	•			E F						
<u>Flanged</u> DN 32 PN 6, EN 1092-1 <sup>5)</sup>				G						
DN 100 PN 6, EN 1092-1 <sup>5)</sup>				G H						
DN 100 PN 16, EN 1092-1 2" ASME 150 lb B16.5				J K						
2 ASME 150 ID B16.5 3" ASME 150 Ib B16.5 4" ASME 150 Ib B16.5				L M						
2" Tri-clamp (DN 50) ISO2852 <sup>6)</sup>				N						
									_	

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Selection and Ordering data	Article	No.	Ord.	code
SITRANS LPS200, compact Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications.	7ML57		<b>-</b> 0	
Process pressure Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	1 2 3			
Process connection material Aluminum <sup>7)</sup> Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) Stainless steel 316L (1.4404) <sup>8)</sup>		1 2 3		
Extension length  100 mm (3.94 inch) <sup>9)</sup> 150 mm (5.91 inch)  200 mm (7.87 inch)  250 mm (9.84 inch)		1 2 3 4		
300 mm (11.81 inch) • Measuring vane		5		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) <sup>10)</sup> ► ► Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) <sup>10)11)</sup> ► Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)			A B C	
Rectangular 50 x 150 mm (1.97 x 5.91 inch) <sup>12)</sup> ◆ Rectangular 50 x 250 mm (1.97 x 9.84 inch) <sup>12)</sup> ◆ Rectangular 98 x 150 mm (3.86 x 5.91 inch) <sup>11)</sup> 12)			D E F	
Rectangular 98 x 250 mm (3.86 x 9.84 inch) <sup>11)12)</sup>			G	
Rectangular 50 x 98 mm (1.97 x 3.86 inch) <sup>12)</sup>			Н	
Approvals  CSA/FM Dust Ignition Proof, RCM  ATEX II 1/2 D, RCM  CSA/FM General Purpose, RCM  CE, RCM  IEC Ex ta/tb IIIC			A B C D	
1)				

- 1) Available with approval option C and D only, up to 0.5 bar
- 2) Not available with process connection A,B, D, E and G
- <sup>3)</sup> Only available with the following configurations 7ML5725-5AC11-2AD0 or 7ML5725-5EE11-2AC0
- Only available with the following configurations 7ML5725-6QC12-2AB0 or 7ML5725-6QE12-2AA0
- 5) Available with process pressure 1 and 2 only
- 6) Available with process temperature 1 only
- Available with process connections A ... F only, process pressure option 1 and process temperature 1 and 5 only
- 8) Available with process connection C, F, H ... N and Measuring vane A
- 9) Available with measuring vane option A, C, D, E, H only
- 10) Add 16 mm (0.63 inch) to extension length
- <sup>11)</sup>Available with extension lengths 2, 3, 4, 5
- <sup>12)</sup>Available with process connections H ... M only
- <sup>13)</sup>Available with approval option B, D, and E only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- Available ex stock. For details see page 9/5 in the appendix.

Point level measurement - Rotation paddle switches

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure <sup>1)2)</sup>	<b>\35</b>
Signal bulb inserted in M20 cable gland <sup>1)</sup>	<b>\20</b>
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing <sup>3)</sup>	<b>(</b> 01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	/14
Additional Operating Instructions A	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E34210883
Spare Parts	
Motor gear /PLC, multi-voltage 7	ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) <b>7</b>	ML1830-1KJ
Rigid extension kit	
(Includes spring coupling, rigid tube extension and required pins)	
Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch) <b>7</b>	ML5711-0AA
Extension: 1 000, 900, 800, 700, 600 mm (39.4, 35.4, 31.5, 27.6, 23.6 inch)	ML5711-1AA
Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch)	ML5711-2AA
Rope extension kit, 2 m (6.56 ft)	ML1830-1KK

Selection and Ordering data	Article No.
Available ex stock	7 it tiole 140.
For details see page 9/5 in the appendix.	
SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply A, process connection C, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval D	7ML1830-1KG
SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C	7ML5725- 5EE11-2AC0
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Q, process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B	7ML5725- 6QC12-2AB0
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Q, process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A	7ML5725- 6QE12-2AA0

- 1) Available with approval option D only
- Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only
- Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.

# Point level measurement - Rotation paddle switches

Oalastica and Oudaring data	A	Ougl	Orlantian and Ordanian data		At 1 - N -	0	- de
Selection and Ordering data SITRANS LPS200, shaft protected	7ML5726-	Ord. code	Selection and Ordering data SITRANS LPS200, shaft protected		Article No 7ML5726		ae
Rotary paddle switch for level and material detection in bulk solids; ideal for heavy, sticky, or high impact applications.  Designed with added protection tube for enhanced shaft protection and protection against build-up on shaft (sidewall build-up).			Rotary paddle switch for level and materia detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection and protection against build-up on shaft (sidewall build-up).				
			Process pressure Up to 0.5 bar (7.25 psi)	<b>&gt;</b> •	1		
Process temperature Up to 80 °C (176 °F)   ◆	1		Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)		3		
Up to 150 °C (302 °F) Up to 250 °C (482 °F)	2		Process connection material Aluminum <sup>6)</sup>	•	1		
Up to 600 °C (1 112 °F) <sup>1)2)</sup> Up to 80 °C (176 °F) basic version <sup>3)</sup>	4 5	ш	Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4305), Stainless steel 316L (1.4404) <sup>7)</sup>	01)	3		
Power supply			Extension length 150 mm (5.91 inch) <sup>8)</sup>				
230 V AC, 1 rev/min.	A		200 mm (7.87 inch)	<b>&gt;</b>		2	
230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min.	B C		250 mm (9.84 inch) 300 mm (11.81 inch)	•		3 4	
230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min.	D E		Extension material (protection tube)				
115 V AC, 1 rev/min.  115 V AC, 1 rev/min., fail-safe	F		Aluminum <sup>9)</sup>	•		A	
115 V AC, 5 rev/min.	G		Stainless steel 303 (1.4305)	<b>&gt;</b>		В	
115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min.	H		Stainless steel 316L (1.4404) <sup>10)</sup> Measuring vane			С	
24 V AC, 1 rev/min.	К		Boot shaped 35 x 106 mm (1.38 x 4.17 inch) <sup>11)</sup>	<b>&gt;</b> •		Α	
24 V DC, 1 rev/min.	L		Hinged vane. 98 x 200 mm	•		В	
24 V DC, 1 rev/min., fail-safe	М		(3.86 x 7.87 inch) <sup>11)12)</sup> Rectangular 50 x 150 mm			D	
24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe	N P		(1.97 x 5.91 inch) <sup>13)</sup>				
Switch selectable 230 V AC/115 V AC/ 24 V DC			Rectangular 50 x 250 mm (1.97 x 9.84 inch) <sup>13)</sup> Rectangular 98 x 150 mm	•		E F	
multi-voltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/	R		Rectangular 98 x 150 mm (3.86 x 5.91 inch) <sup>12)13)</sup> Rectangular 98 x 250 mm (3.86 x 9.84 inch) <sup>12)13)</sup>	•		G	
24 V DC multi-voltage, 5 rev/min. 48 V AC, 1 rev/min., fail-safe	z	J1A	(3.86 x 9.84 inch) (4.747)  Rectangular 50 x 98 mm (1.97 x 3.86 inch)	•		н	
48 V AC, 5 rev/min.	z	J 1 B	Approvals		•		
48 V AC, 5 rev/min., fail-safe	Z	J1C	CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM	<b>&gt;0</b>		1 2	
24 V AC, 1 rev/min., fail-safe 24 V AC, 5 rev/min.	Z Z	J1D J1E	CSA/FM General Purpose, RCM			3	
24 V AC, 5 rev/min., fail-safe Universal Voltage, 1 rev/min. <sup>14)</sup>	z z	J1F J2A	CE, RCM IEC Ex ta/tb IIIC	•		4 5	
Universal Voltage, 1 rev/min, fail-safe <sup>14)</sup>	z	J2B	1) Available with approval option 3 and 4 on		ıp to max 0	.5 bar	
Universal Voltage, 5 rev/min. 14) Universal Voltage, 5 rev/min, fail-safe 14)	z z	J2C J2D	<ol> <li>Not available with process connections A</li> <li>Only available with the following configurations of the process of the pro</li></ol>		ML5726-5Q	)B12-2BA2	or 2
Process connection		025	7ML5726-5QC12-2BA1  4) Available with process pressure 1 and 2 c	nlv			
Threaded			5) Available with process temperature 1 only	,			
G 1¼" [(BSPP), EN ISO 228-1]	A		6) Available with process connections A E pressure option 1 only, and process temp			h process	
G 1½" [(BSPP), EN ISO 228-1]  1¼" NPT [(Taper), ANSI/ASME B1.20.1]	_		7) Extension and vane will also change to 31 B, D, FL and vane A			ss connect	tion
1½" NPT [(Taper), ANSI/ASME B1.20.1] •	D		8) Available with measuring vane options A,				
Flanged			9) Available with process pressure 1 and pro			1 only	
DN 32 PN 6, EN 1092-1 <sup>4)</sup> DN 100 PN 6, EN 1092-1 <sup>4)</sup>	E F		<ul><li>10) Available with process connections B, D,</li><li>11) Add 16 mm (0.63 inch) to extension lengt</li></ul>		ına vane A		
DN 100 PN 16, EN 1092-1	G		12) Available with extension length options 2	4 onl			
2" ASME 150 lb B16.5	Н		<sup>13)</sup> Available with process connections F, G, I		only		
3" ASME 150 lb B16.5	J		<ul> <li>Available with approval options 2, 4 and 5</li> <li>We can offer shorter delivery times for contact the shorter delivery times for contact the shorter delivery times.</li> </ul>		one dooice	atad with t	the
4" ASME 150 lb B16.5	K		Quick Ship Symbol . For details see pag	ge 9/5 ir	n the apper	ndix.	ıı IC
2" Tri-clamp (DN 50) ISO2852 <sup>5)</sup>	L		Available ex stock. For details see page 9	9/5 in the	e appendix	•	

# Point level measurement - Rotation paddle switches

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure 1)2)	A35
Signal bulb inserted in M20 cable gland <sup>1)</sup>	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing <sup>3)</sup>	K01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E34210883
Spare Parts	
Motor gear /PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
Available ex stock For details see page 9/5 in the appendix.	
	7ML5726- 5QB12-2BA2
	7ML5726- 5QC12-2BA1

<sup>1)</sup> Available with approval option 4 only

<sup>3)</sup> Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.

Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, cable extension		7ML5727-
Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	-	
Process temperature Up to 80 °C (176 °F)	•	1
Up to 150 °C (302 °F) Up to 250 °C (482 °F)		2 3
Up to 600 °C (1 112 °F) <sup>1)2)</sup> Up to 80 °C (176 °F) basic version <sup>3)</sup>		4 5
Power supply		
230 V AC, 1 rev/min.		A
230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min.	•	B C
230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min.	•	D E
115 V AC, 1 rev/min., fail-safe		F
115 V AC, 5 rev/min.	•	G
115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min.	•	H J
24 V AC, 1 rev/min. 24 V DC, 1 rev/min.	•	K L
24 V DC, 1 rev/min., fail-safe		М
24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe	•	N P
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min.	•	Q
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 5 rev/min. 48 V AC, 1 rev/min., fail-safe	•	R Z J 1 A
48 V AC, 5 rev/min. 48 V AC, 5 rev/min., fail-safe		Z J 1 E
24 V AC, 1 rev/min., fail-safe 24 V AC, 5 rev/min.		Z J 1 E
24 V AC, 5 rev/min., fail-safe Universal Voltage, 1 rev/min. <sup>9)</sup>		Z J 1 F Z J 2 A
Universal Voltage, 1 rev/min, fail-safe <sup>9)</sup> Universal Voltage, 5 rev/min. <sup>9)</sup>		Z J 2 E J 2 C
Universal Voltage, 5 rev/min, fail-safe9)		Z J 2 D
Process connection		
Threaded G 11/4" [(BSPP), EN ISO 228-1]	•	A
G 1½" [(BSPP), EN ISO 228-1]	•	В
11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•	С
1½" NPT [(Taper), ANSI/ASME B1.20.1]	•	D
Flanged		
DN 32 PN 6, EN 1092-1 <sup>4)</sup> DN 100 PN 6, EN 1092-1 <sup>4)</sup>		E F
DN 100 PN 16, EN 1092-1		G
2" ASME 150 lb B16.5 3" ASME 150 lb B16.5		H J
4" ASME 150 lb B16.5		K

<sup>&</sup>lt;sup>2)</sup> Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

# Point level measurement - Rotation paddle switches

Selection and Ordering data		Article	No. (	Ord.	code	e
SITRANS LPS200, cable extension		7ML57				
Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications				Ī	П	
Process pressure						
Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi)		1 2				
Up to 10 bar (145 psi)		3				
Process connection material						
Aluminum <sup>5)</sup>	•		1			
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541)	•		2			
Cable extension length		· '				
Standard cable length, 2 000 mm (78.74 inch)	•		0			
Add Order code Y01 and plain text: "Insertion length mm"						
500 1 000 mm (19.69 39.37 inch)	•		1			
Cable length 1 001 2 000 mm (39.41 78.74 inch)			2			
Cable length 2 001 3 000 mm (78.78 118.11 inch)	•		3			
Cable length 3 001 4 000 mm (118.15 157.48 inch)	•		4			
Cable length 4 001 5 000 mm (157.52 196.85 inch)	•		5			
Cable length 5 001 6 000 mm (196.89 236.22 inch)	•		6			
Cable length 6 001 7 000 mm (236.26 275.59 inch)	•		7			
Cable length 7 001 10 000 mm	•		8			
(275.63 393.70 inch) Without extension <sup>8)</sup>			9		N 1	٨
			9		14 1 /	
Measuring vane Boot shaped, 35 x 106 mm	•			Α		
(1.38 x 4.17 inch) <sup>6)</sup>	_			^		
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) <sup>6)</sup>	•			В		
Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) <sup>7)</sup>	•			С		
Rectangular 50 x 150 mm (1.97 x 5.91 inch) <sup>7)</sup>	•			D		
Rectangular 50 x 250 mm (1.97 x 9.84 inch) <sup>7)</sup>	•			E		
Rectangular 98 x 150 mm (3.86 x 5.91 inch) <sup>7)</sup>	•			F		
Rectangular 50 x 98 mm (1.97 x 3.86 inch) <sup>7)</sup>	•			G		
Approvals						
CSA/FM Dust Ignition Proof, RCM	•			A		
ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM	•			B		
CE, RCM	•			D		
IEC Ex ta/tb IIIC				Ε		

1)	Available v	with	approval	option (	С	and	D	up	to	max.	0.5	bar	
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- $^{2)}\,$  Not available with process connections A, C, E
- 3) Only available with the following configurations 7ML5727-5QC12-0AA0 or 7ML5727-5QB12-0AB0
- 4) Available with process pressure 1 and 2 only
- 5) Available with process connections A ... E only, process pressure option 1 only and process temperature options 1 and 5 only
- $^{6)}$  Add 16 mm (0.63 inch) to extension length
- $^{7)}\,$  Available with process connections F  $\dots$  K only
- 8) Not available with P01 and available with Approval D, mounting kit for rope extension included
- $^{9)}\,$  Available with approval options B,D, and E only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 10 000 mm (393.70 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Reinforced cable (max. 28 kN pulling force) <sup>1)</sup>	P01
Heating of enclosure <sup>2)3)</sup>	A35
Signal bulb inserted in M20 cable gland <sup>2)</sup>	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing <sup>4)</sup>	K01
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E34210883
Spare Parts	
Motor gear /PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, $35 \times 106$ mm $(1.38 \times 4.17 \text{ inch})$	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
Available ex stock For details see page 9/5 in the appendix.	
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Q, process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B	7ML5727- 5QB12-0AB0
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Q, process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A	7ML5727- 5QC12-0AA0

- $^{1)}$  Available only for process temperature up to 80 °C  $\,$  (176 °F) and process connection material 2  $\,$
- 2) Available with approval option D only
- <sup>3)</sup> Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only
- 4) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design

Point level measurement - Rotation paddle switches

5	
Selection and Ordering data	Article No. Ord. code
SITRANS LPS200, angled extension Rotary paddle switch with robust design for evel and material detection in bulk solids; deal for heavy or sticky applications. Angled extension is designed to avoid falling naterial and rotates horizontally in side mount applications to continue working even with leavy build-up.	
Click on the Article No. for the online confi- guration in the PIA Life Cycle Portal.	
Process temperature Jp to 80 °C (176 °F) Jp to 150 °C (302 °F) Jp to 250 °C (482 °F)	1 2 3
Power supply 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 15 V AC, 1 rev/min. 15 V AC, 1 rev/min. 15 V AC, 5 rev/min. 15 V AC, 5 rev/min. 15 V AC, 5 rev/min. 14 V AC, 1 rev/min. 15 V AC, 1 rev/min. 15 V AC, 1 rev/min. 16 V AC, 1 rev/min. 17 V AC, 1 rev/min. 18 V AC, 1 rev/min. 18 V AC, 1 rev/min. 19 V AC, 5 rev/min. 19 V DC, 5 rev/min., fail-safe 19 V DC, 5 rev/min., fail-safe 19 V DC, 5 rev/min., fail-safe	A B C D E F G H J K L M N P C
Switch selectable 230 V AC/115 V AC/24 V DC nulti-voltage, 1 rev/min.  Switch selectable 230 V AC/115 V AC/24 V DC nulti-voltage, 5 rev/min.  18 V AC, 1 rev/min., fail-safe  18 V AC, 5 rev/min.  18 V AC, 5 rev/min., fail-safe  24 V AC, 1 rev/min., fail-safe	
24 V AC, 5 rev/min. 24 V AC, 5 rev/min., fail-safe Universal Voltage, 1 rev/min. <sup>2)</sup> Universal Voltage, 1 rev/min, fail-safe <sup>2)</sup>	Z J1E Z J1F Z J2A Z J2B
Jniversal Voltage, 5 rev/min. <sup>2)</sup> Jniversal Voltage, 5 rev/min, fail-safe <sup>2)</sup>	Z J2C Z J2D
Process connection Flanged DN 100 PN 6, EN 1092-1 <sup>1)</sup> DN 100 PN 16, EN 1092-1 I" ASME 150 lb B16.5	A B C
Process pressure Jp to 0.5 bar (7.25 psi) Jp to 5 bar (72.5 psi) Jp to 10 bar (145 psi)	1 2 3
Process connection material Stainless steel 303/321 (1.4305/1.4541)	1
Extension length 25 mm (4.92 inch) 50 mm (5.91 inch) 200 mm (7.87 inch) 250 mm (9.84 inch)	1 2 3 4 5

Selection and Ordering data	Article No. Ord. code
SITRANS LPS200, angled extension Rotary paddle switch with robust design for level and material detection in bulk solids; ideal for heavy or sticky applications. Angled extension is designed to avoid falling material and rotates horizontally in side mount applications to continue working even with heavy build-up.	7ML5728-
Measuring vane Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch) Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch) Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch) Rectangular vane 98 x 150 mm (3.86 x 5.91 inch) Rectangular vane 98 x 250 mm (3.86 x 9.84 inch)	A B C D
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)  Approvals  CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM CE, RCM IEC Ex ta/tb IIIC	F A B C D E
1) Assallation with annual and a section of a section	

- 1) Available with process pressure 1 and 2 only
- $^{2)}\,$  Available with approval option B,D, and E only

Selection and Ordering data	Order code
Further Designs	0.40. 0040
Please add "-Z" to Article No. and specify Order code(s).	
Heating of enclosure <sup>1)2)</sup>	A35
Signal bulb inserted in M20 cable gland <sup>1)</sup>	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing <sup>3)</sup>	K01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Mill- tronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E34210883
Spare Parts	
Motor gear /PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

- 1) Available with approval option D only
- <sup>2)</sup> Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only
- 3) This option does not automatically implement a food conform design

Point level measurement - Rotation paddle switches

Selection and Ordering data		Ar	ticle No.	Ord	d. co	ode	Selection
SITRANS LPS200, rigid extension		71	/IL5730-	•			SITRANS
Rotary paddle switch for top mount point level and material detection in bulk solids							Rotary pa level and
Click on the Article No. for the online co figuration in the PIA Life Cycle Portal.	n-						Process Up to 0.5
Process temperature							Up to 5 b
Jp to 80 °C (176 °F) Jp to 150 °C (302 °F)		1 2					Up to 10 Process
Jp to 250 °C (482 °F)		3					Aluminum
Jp to 600 °C (1 112 °F) <sup>1)2)</sup>		4					Stainless flanges 3
Power supply 230 V AC, 1 rev/min.			A				Stainless
230 V AC, 1 rev/min., fail-safe			В				<b>Extensio</b> Aluminun
230 V AC, 5 rev/min.			C D				Stainless
230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min.	•		E				Stainless
I15 V AC, 1 rev/min., fail-safe			F				<b>Extensio</b> Aluminun
115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe	•		G H				250 50
18 V AC, 1 rev/min.	•		J				501 75 751 1 (
24 V AC, 1 rev/min.	•		K L				1 001
24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe			M				1 251
24 V DC, 5 rev/min.	•		N				1 501 1 751
24 V DC, 5 rev/min., fail-safe			P				2 001
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min.		ľ	Q				2 251
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 5 rev/min.	•		R				2 501 : 2 751 :
48 V AC, 1 rev/min., fail-safe			z			J 1 A	3 001
48 V AC, 5 rev/min.			Z			J 1 B	3 251 3 501
48 V AC, 5 rev/min., fail-safe 24 V AC, 1 rev/min., fail-safe			Z Z			J1C J1D	3 751
24 V AC, 5 rev/min.			z			J 1 E	Stainless
24 V AC, 5 rev/min., fail-safe Universal Voltage, 1 rev/min. <sup>14)</sup>			Z Z			J1F J2A	250 50 501 75
Universal Voltage, 1 rev/min, fail-safe <sup>14)</sup>			z			J 2 B	751 1
Universal Voltage, 5 rev/min. <sup>14)</sup> Universal Voltage, 5 rev/min, fail-safe <sup>14)</sup>			Z Z			J 2 C J 2 D	1 001 1 501
Process connection			2			J Z D	2 001
Threaded							2 501
G 11/4" [(BSPP), EN ISO 228-1] G 11/2" [(BSPP), EN ISO 228-1]	•		A B				3 001 Stainless
11/4" NPT [(Taper), ANSI/ASME B1.20.1]	•		С				250 50
1½" NPT [(Taper), ANSI/ASME B1.20.1]	•		D				501 75 751 1
<u>Flanged</u> DN 32 PN 6, EN 1092-1 <sup>3)</sup>			E				1 001
DN 100 PN 6, EN 1092-1 <sup>3)</sup>			F				1 501
DN 100 PN 16, EN 1092-1			G				2 001 2 501
2" ASME 150 lb B16.5 3" ASME 150 lb B16.5			J				3 001
4" ASME 150 lb B16.5			K				
2" Tri-clamp 2' (DN 50) ISO2852 <sup>4)</sup>			L				

Selection and Ordering data		Article No.		Ord.	code
SITRANS LPS200, rigid extension		7ML5730-	•		
Rotary paddle switch for top mount point level and material detection in bulk solids		Helen-			-11
Process pressure					
Up to 0.5 bar (7.25 psi)		1 2			
Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)		3			
Process connection material					
Aluminum <sup>5)</sup>	•	1			
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301	)	2			
Stainless steel 316L (1.4404) <sup>6)</sup>	,	3			
Extension material (protection tube)					
Aluminum <sup>7/8)</sup> Stainless stant 203 (1, 4305) <sup>9)</sup>			0		
Stainless steel 303 (1.4305) <sup>9)</sup> Stainless steel 316L (1.4404) <sup>10)11)</sup>	_		2		
Extension length					
Aluminum					
250 500 mm (9.84 19.69 inch)	•			A B	
501 750 mm (19.72 29.53 inch) 751 1 000 mm (29.57 39.37 inch)	•			C	
1 001 1 250 mm (39.41 42.21 inch)	•			D	
1 251 1 500 mm (49.25 59.06 inch)				E	
1 501 1 750 mm (59.09 68.90 inch)				F	
1 751 2 000 mm (68.94 78.74 inch) 2 001 2 250 mm (78.78 88.58 inch)	•			G H	
2 251 2 500 mm (88.62 98.43 inch)	•			J	
2 501 2 750 mm (98.46 108.27 inch)	•			K	
2 751 3 000 mm (108.31 118.11 inch)	•			L	
3 001 3 250 mm (118.15 127.95 inch)				M	
3 251 3 500 mm (127.99 137.80 inch) 3 501 3 750 mm (137.83 147.64 inch)	•			N P	
3 751 4 000 mm (147.67 157.48 inch)				Q	
Stainless steel 303 (1.4305)					
250 500 mm (9.84 19.69 inch)	•			R S	
501 750 mm (19.72 29.53 inch) 751 1 000 mm (29.57 39.37 inch)	•			T	
1 001 1 500 mm (39.41 59.05 inch)	•			U	
1 501 2 000 mm (59.09 78.74 inch)	•			٧	
2 001 2 500 mm (78.78 98.42 inch)				W	
2 501 3 000 mm (98.46 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch)	•			X Y	
Stainless steel 316L (1.4404)	_				
250 500 mm (9.84 19.69 inch)				z	P 1 A
501 750 mm (19.72 29.53 inch)				Z	P1B
751 1 000 mm (29.57 39.37 inch)				Z Z	P1C P1D
1 001 1 500 mm (39.41 59.05 inch) 1 501 2 000 mm (59.09 78.74 inch)				z	P1E
2 001 2 500 mm (78.78 98.42 inch)				Z	P 1 F
2 501 3 000 mm (98.46 118.11 inch)				Z	P 1 G
3 001 4 000 mm (118.5 157.48 inch)				Z	P 1 H

# Point level measurement - Rotation paddle switches

Selection and Ordering data		Article No.	Ord.	code	
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level and material detection in bulk solids		7ML5730-			
Measuring vane Boot shaped, 35 x 106 mm (1.34 x 4.17 inch) <sup>12</sup> Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) <sup>12</sup> Rectangular 50 x 150 mm (1.97 x 5.91 inch) <sup>13</sup> Rectangular 50 x 250 mm (1.97 x 9.84 inch) <sup>13</sup> Rectangular 98 x 150 mm (3.86 x 5.91 inch) <sup>13</sup> Rectangular 98 x 250 mm (3.86 x 9.84 inch) <sup>13</sup> Rectangular 98 x 250 mm (3.86 x 9.84 inch) <sup>13</sup> Rectangular 50 x 98 mm (1.97 x 3.86 inch) <sup>13</sup>	• • • • • •		A B C D E		
Approvals CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM CE, RCM IEC Ex ta/tb IIIC	• • • •		1 2 3 4 5		

- 1) Available with approval option 3 and 4, up to max 0.5 bar
- 2) Not available with process connection A, C, E
- 3) Available with process pressure 1 and 2 only
- 4) Available with process temperature 1 only
- 5) Available with process connections A ... E only, with process pressure option 1 only and process temperature 1 only
- 6) Available with process connection B, D, F ... L and measuring vane option A
- 7) Available with process pressure 1 and process temperature 1 only
- $^{8)}\,$  Available with extension length options A  $\dots$  Q only
- 9) Available with extension length options R ... Y only
- <sup>10)</sup>Available with process connection B, D, F ... L and measuring vane A, process connection material 3. Available only with extension length options P1A ... P1H only
- <sup>11)</sup>Only available with seal at tube end, option P06 ... P09
- <sup>12)</sup>Add 16 mm (0.63 inch) to extension length
- <sup>13)</sup>Available with process connections F, G, H, J, K only
- <sup>14)</sup>Available with approval options 2, 4 and 5 only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix

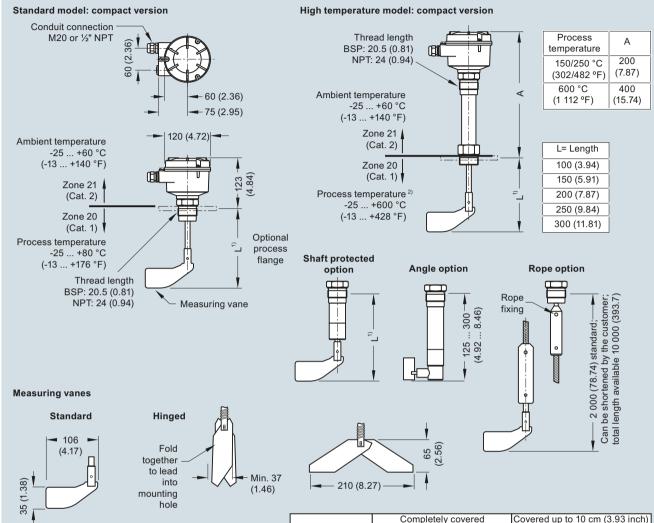
Selection and Ordering data	Order code
Further Designs Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Heating of enclosure <sup>1)2)</sup>	A35
Signal bulb inserted in M20 cable gland <sup>1)</sup>	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing $^{3)4)}$	K01
Seal at tube end for ingress protection and shaft stability	
Max. temperature 80 °C (176 °F)	P06
Max. temperature 150 °C (302 °F)	P07
Max. temperature 250 °C (482 °F)	P08
Max. temperature 600 °C (1 112 °F)	P09
Sliding sleeve (standard, max. pressure 0.5 bar) <sup>1)5)</sup>	P12
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered) <sup>6)</sup>	P13
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E34210883
Spare Parts	
Motor gear/PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

- 1) Available with approval option 4 only
- 2) 15) Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only
- $^{\rm 3)}$  Available when ordered with ingress protection seal P06  $\ldots$  P09 only
- 4) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design
- 5) Available with process pressure 1 only
- 6) Available up to 250 °C (482 °F)

Point level measurement - Rotation paddle switches

### **SITRANS LPS200**

# Dimensional drawings



# Rectangular

# Rectangular vane options A B 50 (1.97) 98 (3.86) 50 (1.97) 150 (5.90) 50 (1.97) 250 (9.84)

150 (5.90)

250 (9.84)

- 1. For 35 x 106 mm boot shaped and 98 x 200 mm hinged measuring vanes, add 16 mm to extension length.
- 2. For use with all approval options except CSA class II. See manual for more details.

98 (3.86)

98 (3.86)

### Notes

For heavy material, only top mounting of paddle switch is recommended.

Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

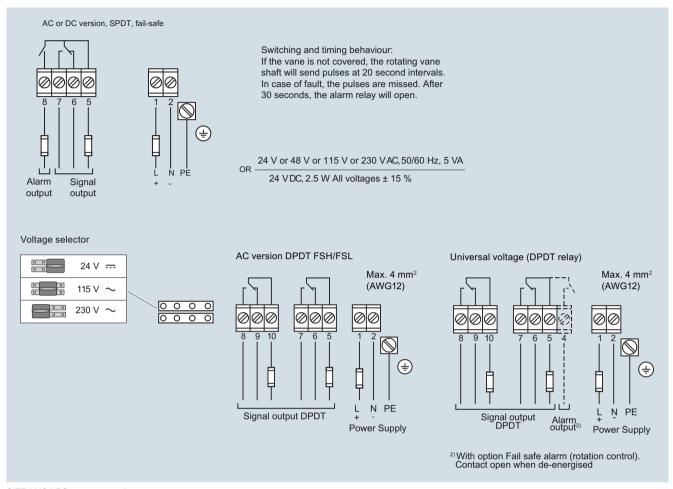
		ly covered naterial	Covered up to 10 cm (3.93 inch) with material				
Vane	Spring ad	djustment	Spring adjustment				
	Light	Central (factory setting)	Light	Central (factory setting)			
Boot shaped	200 g/l	300 g/l	100 g/l	150 g/l			
35 x 106 mm	(12.5 lb/ft³)	(18.7 lb/ft³)	(6.2 lb/ft³)	(9.4 lb/ft³)			
Boot shaped	300 g/l	500 g/l	150 g/l	150 g/l			
28 x 98 mm	(18.7 lb/ft³)	(31.2 lb/ft³)	(9.4 lb/ft³)	(9.4 lb/ft³)			
Rectangular	300 g/l	500 g/l	150 g/l	250 g/l			
50 x 98 mm	(18.7 lb/ft³)	(31.2 lb/ft³)	(9.4 lb/ft³)	(15.6 lb/ft³)			
Rectangular	80 g/l	120 g/l	40 g/l	60 g/l			
50 x 150 mm	(5.0 lb/ft³)	(7.5 lb/ft³)	(2.5 lb/ft³)	(3.7 lb/ft³)			
Rectangular	30 g/l	50 g/l	15 g/l	25 g/l			
50 x 250 mm	(1.9 lb/ft³)	(3.1 lb/ft³)	(0.9 lb/ft³)	(1.6 lb/ft³)			
Rectangular	30 g/l	50 g/l	15 g/l	25 g/l			
98 x 150 mm	(1.9 lb/ft³)	(3.1 lb/ft³)	(0.9 lb/ft³)	(1.6 lb/ft³)			
Rectangular	20 g/l	30 g/l	15 g/l	15 g/l			
98 x 250 mm	(1.2 lb/ft³)	(1.9 lb/ft³)	(0.9 lb/ft³)	(0.9 lb/ft³)			
Hinged	70 g/l	100 g/l	35 g/l	50 g/l			
98 x 200 mm	(4.4 lb/ft³)	(6.2 lb/ft³)	(2.2 lb/ft³)	(3.1 lb/ft³)			

SITRANS LPS200, dimensions in mm (inch)

Point level measurement - Rotation paddle switches

### SITRANS LPS200

# Schematics



SITRANS LPS200 connections

Point level measurement - Ultrasonic non-contacting switch

Pointek ULS200

### Overview



The Pointek ULS200 is an ultrasonic non-contacting switch with Design two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

### Benefits

- 2 switch outputs for high-high, high, low and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate enclosure, Type 6/NEMA 6/IP67
- Easy, two-button programming

# Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage, and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime, and equipment replacement costs.

Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

### Installation

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives.

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

### Mounting and Interconnection

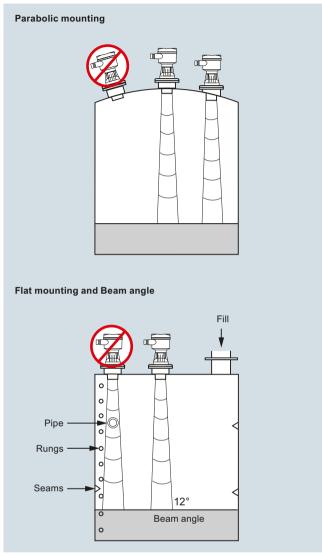
The Pointek ULS200 is available in three thread types: 2" NPT. R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3 inch) flange adapter for mating to 3" ASME, DN 65, PN 10, and JIS 10K 3B sized flanges.

Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

Point level measurement - Ultrasonic non-contacting switch

Pointek ULS200

# Configuration



Pointek ULS200 Mounting

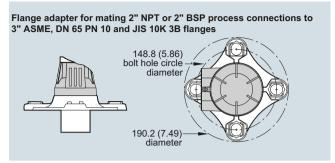
Point level measurement - Ultrasonic non-contacting switch

# Pointek ULS200

# Technical specifications

lechnical specifications	
Mode of operation	
Measuring principle	Ultrasonic level switch
Measuring range	
Measuring range in liquids	0.25 5 m (0.8 16.4 ft)
Measuring range in bulk solids	0.25 3 m (0.8 9.8 ft)
Output	
AC Version (relay)	2 SPDT Form C contacts, rated 5 A at 250 V AC or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (relay)	2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version • Resolution • Repeatability	3 mm (0.1 inch) 0.25 % of measuring range
Rated operation conditions	
Installation conditions  • Location  • Beam angle	Indoors/outdoors 12°
Ambient conditions  • Ambient temperature  • If mounted in metal threads	-40 +60 °C (-40 +140 °F) -20 +60 °C (-5 +140 °F)
Medium conditions • Process pressure	0.5 bar (7.25 psi) max.
Design	
Material	Polycarbonate with gasket
Weight	Approx. 1.5 kg (3.3 lb)
Transducer material	PVDF or ETFE copolymer
Optional flange adapter	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1] For 3" ASME, DN 65, PN 10 and JIS 10 K3B
Sanitary mounting	4" sanitary fitting clamp
Power supply	
AC version	100 230 V AC, $\pm$ 15 %, 50/60 Hz, max. 12 VA, 5 W
DC version	18 30 V DC, 3 W
Displays and controls	
Display	LCD, three digits, 9 mm (0.35 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys
Electronics/enclosure	Connection: terminal block, max. 2.5 mm <sup>2</sup> (14 AWG) solid/ 1.5 mm <sup>2</sup> (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x ½" NPT or 2 x PG 13.5
Certificates and approvals	CE (EMC certificate available on request), CSA $_{\rm US/C},$ FM

# Options



Pointek ULS200 Optional Flange Adapter, dimensions in mm (inch)

Point level measurement - Ultrasonic non-contacting switch

# Pointek ULS200

Selection and Ordering data		Α	rticl	e١	10.
Pointek ULS200		71	ML1	151	0-
Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials		•		0	
${\ensuremath{\nearrow}}$ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Power supply 24 V DC, relay output 24 V DC, transistor output 100 230 V AC, relay output	• • •	1 2 3			
Approvals					
CE, RCM, CSA Class I, II, Div. 2 <sup>1)</sup> CE, RCM, CSA <sub>us/c</sub> , FM	•		J K		
Transducer/Process connection ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1] EFTE, R 2" [(BSPT), EN 10226] EFTE, G 2" [(BSPP), EN ISO 228-1]	• • •		A B C		
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G [(BSPP), EN ISO 228-1]	• • •		E F G		
PVDF copolymer, 4" sanitary mounting <sup>2)</sup>			J		
Enclosure/cable inlet					
Ocable inlet PG 13.5 Cable inlet ½" NPT	•			1 2	

<sup>1)</sup> Available with Enclosure/cable inlet option 2 only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s)	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ■ Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
Quick Start manual, multi-language	A5E32268616
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
Universal Box Bracket Mounting Kit	7ML1830-1BK
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" BSPT Locknut, plastic	7ML1830-1DQ
2" NPT Locknut	7ML1830-1DT
4" sanitary mounting clamp	7ML1830-1BR
Spare Parts	
Polycarbonate Lid	7ML1830-1LG

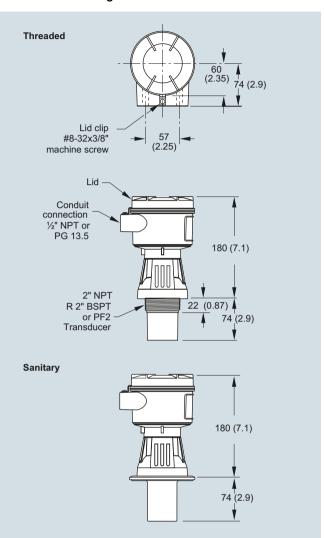
We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

<sup>2)</sup> Available with Approvals option K only

Point level measurement - Ultrasonic non-contacting switch

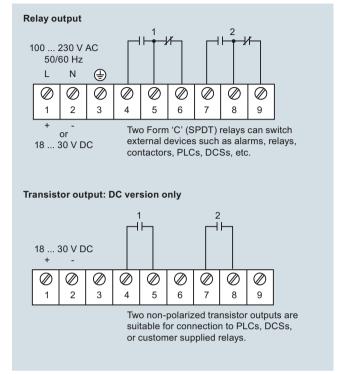
# Pointek ULS200

# Dimensional drawings



Pointek ULS200, dimensions in mm (inch)

# Schematics



Pointek ULS200 connections

Continuous level measurement - Ultrasonic

### **Ultrasonic**

### Overview

### Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20 000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

### Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

### Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation: Distance = (Velocity of Sound x Time)/2.

### Mode of operation

### Common Terms

### Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

### Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

### Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

### Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

### Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

### Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

# Continuous level measurement - Ultrasonic

Ultrasonic

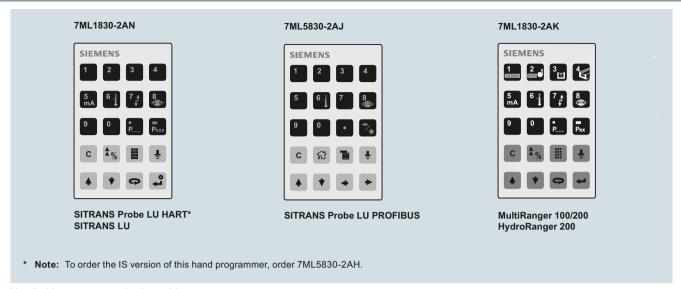
# Technical specifications

### Ultrasonic Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	SITRANS LUT400	HydroRanger 200	MultiRanger 100/200	SITRANS LU
Range	6 m (20 ft) or 12 m (40 ft)	0.3 60 m (1 196 ft), transducer and applica- tion dependent	15 m (50 ft) transducer and application depen- dent	15 m (50 ft) transducer and application depen- dent	60 m (200 ft) transducer and application depen- dent
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hop- pers, chemical storage, liquid storage, crusher bins, dry solids storage	Chemical storage, liquid storage, bulk solids stor- age (sugar, flour bins, grains, cereals), plastic pellets
Output	HART model: 4 20 mA/HART PROFIBUS PA model: PROFIBUS	4 20 mA/HART 3 relays	6 relays standard, two 4 20 mA outputs (isolated)	1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 20 mA outputs (isolated)	4 relays (LU01, LU02) Up to 40 relays (LU10) 4 20 mA isolated
Communications	HART or PROFIBUS PA Options: • SIMATIC PDM for remote configuration and diagnostics	HART 7.0, USB, SIMATIC PDM	Built-in Modbus RTU/ ASCII via RS-485 Options: • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet)	Built-in Modbus RTU or ASCII via RS-485 Options: • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet)	Dolphin, RS 232/RS 485 (LU01, LU02) Dolphin via infrared (LU10)
Power specifications	HART: 4 20 mA, 24 V DC nominal, max. 550 $\Omega$ , 30 V DC max. PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming	AC version: 100 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V DC version: 10 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V	AC version: 100 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 30 V DC, 20 W	AC version: 100 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 30 V DC, 20 W	LU01, LU02: AC version: 100/115/200/ 230 V AC DC version: 18 30 V DC, 25 W LU10: 100/115/200/230 V AC
Approvals	CE, CSA <sub>US/C</sub> , FM, RCM, ATEX, IECEX	CE, CSA <sub>US/C</sub> , UL Listed, FM, RCM, Lloyd's Register, ABS	CE, CSA <sub>US/C</sub> , UL Listed, FM, RCM	CE, CSA <sub>US/C</sub> , UL Listed, FM, RCM	CE, CSA <sub>US/C</sub> , FM, Lloyd's Register

Continuous level measurement - Ultrasonic

### Ultrasonic



Handheld programmer selection guide

# Application

# **SIEMENS**

Ultrasonic Level Applic	ation Questionr	naire	
Customer information  Contact:  Company:  Address:  City:  City:  Zip/Postal Code:  Fax: ( )  E-m	ountry:	Date:  Notes on the A	
Tanks/Vessel information (Supply  Type: Storage Process Pump station Open channel	bimensions: Height: Width/Diameter:	m/ft	Critical Information  Nozzle Length: cm/inch  Nozzle Diameter: cm/inch
Tank top: Open Tank botto Flat Conical Parabolic  Measurement type: Point Lev	Flat (Eg. supp	ernal equipment d/or obstructions: Agitator, heating coils, poorts, other)  rel  Volume	No Yes Please list
	°C/°F		Slurry    Liquid    Solid
Installation (indicate all that apply)  Power available:	Outputs required:  4 20 mA	□ H □ P	munications:  IART/4 20 mA
Products recommended:  © Siemens Milltronics Process Instruments Inc.	www.siemens	s.com/processautoma	

Continuous level measurement - Ultrasonic transmitters

#### **SITRANS Probe LU**

#### Overview



SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.

#### Benefits

- Continuous level measurement up to 12 m (40 ft) range
- · Easy installation and simple start-up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- · Sonic Intelligence signal processing
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

### Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

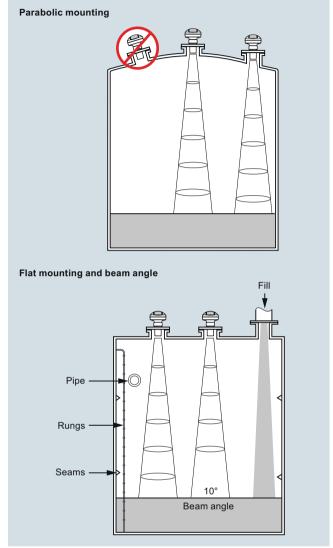
The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.

 Key Applications: chemical storage vessels, filter beds, liquid storage vessels

### Configuration



SITRANS Probe LU mounting

# Continuous level measurement - Ultrasonic transmitters

### SITRANS Probe LU

# Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels
Inputs	
Measuring range • 6 m (20 ft) model • 12 m (40 ft) model	0.25 6 m (10 inch 20 ft) 0.25 12 m (10 inch 40 ft)
Frequency	54 kHz
Outputs	
mA/HART • Range • Accuracy	4 20 mA ± 0.02 mA
PROFIBUS PA	Profile 3, Class B
Performance Resolution Accuracy	≤ 3 mm (0.12 inch) ± the greater of 0.15 % of range or
,	6 mm (0.24 inch)
Repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.25 m (10 inch)
Update time • 4/20 mA/HART version • PROFIBUS version	$\leq$ 5 s $\leq$ 5 s at 4 mA $\leq$ 4 s at 15 mA current loop
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°
Rated operating conditions	
Ambient conditions  Location  Ambient temperature  Relative humidity/ingress protection  Installation category  Pollution degree	Indoor/outdoor -40 +80 °C (-40 +176 °F) Suitable for outdoor I
Medium conditions  Temperature at flange or threads Pressure (vessel)	-40 +85 °C (-40 +185 °F) 0.5 bar g (7.25 psi g)
Design	
Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/ IP67/IP68 enclosure
Weight	2.1 kg (4.6 lb)
Cable inlet	2 x M20x1.5 cable gland or 2 x $\frac{1}{2}$ " NPT thread or 1 x M20 x 1.5 and 1 x $\frac{1}{2}$ " NPT
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)

Process connection	
Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Flange connection	3 inch (80 mm) universal flange
Other connection	FMS 200 mounting bracket (see page
Other connection	5/189) or customer supplied mount
Display and Controls	
Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Memory	Non-volatile EEPROM
Power supply	
4 20 mA/HART	Nominal 24 V DC with 550 $\Omega$ maximum; maximum 30 V DC 4 20 mA
PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version)
	Per IEC 61158-2
Certificates and Approvals	
General	CSA <sub>US/C</sub> , FM, CE, RCM
Marine (only applies to HART communication option)	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li></ul>
Hazardous Intrinsically Safe (Europe) Intrinsically Safe (USA/Canada)  Intrinsically Safe (International)	ATEX II 1G Ex ia IIC T4 Ga CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 SIR 13.0008X Ex ia IIC T4 Ga
<ul><li>Intrinsically Safe (Brazil)</li><li>Non-incendive (USA)</li></ul>	INMETRO Ex ia IIC T4 Ga FM Class I, Div. 2, Groups A, B, C, D T4
Handheld Programmer	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
Approvals for handheld programmer	
	Ex ia IIC T4 Ga
	Ex iaD 20 T135 °C
	FM/CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T6
Ambient temperature	-20 50 °C (-5 122 °F)
Interface	Proprietary infrared pulse signal
Power	3 V lithium battery (non-replaceable)

### Continuous level measurement - Ultrasonic transmitters

### SITRANS Probe LU

Selection and Ordering data		Αı	rtic	le 1	٧o.	Т
SITRANS Probe LU 2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.				522		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.						
Enclosure/Cable Inlet Plastic (PBT), 1 x M20x1.5 and 1 x ½" NPT (no cable glands supplied) Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM) Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	• •	0 1 2				
Range/Transducer material 6 m (20 ft), ETFE 6 m (20 ft), PVDF Copolymer 12 m (40 ft), ETFE 12 m (40 ft), PVDF Copolymer	••••		A B C			
Process connection 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] G 2" [(BSPP), EN ISO 228-1]	•		E	3		
Communication/Output 4 20 mA, HART PROFIBUS PA	•			1 2		
Approvals General Purpose, FM, CSA <sub>US/C</sub> , CE, RCM, KCC Non-incendive, FM Class I, Div. 2 Groups A,B,C,D T5 <sup>1)</sup>	•			1		
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 <sup>2</sup> Intrinsically Safe ATEX 1G / IECEx / INMETRO	) <b>•</b>			5		
Ex ia IIC T <sup>4</sup> Ga, RCM, KCC <sup>2</sup> ) Intrinsically Safe ATEX 1G / IECEx / INMETRO Ex ia IIC T <sup>4</sup> Ga, RCM, KCC <sup>3</sup> ) Intrinsically safe, CSA/FM Class I, Div. 1, Groups A,	•			7		
B, C, D; Class II, Div. 1 Groups E, F, G; Class III T43)						

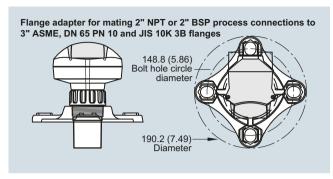
- 1) Available with Enclosure/Cable Inlet option 2 only.
- <sup>2)</sup> Available with communication option 2 only.
- <sup>3)</sup> Available with communication option 1 only.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

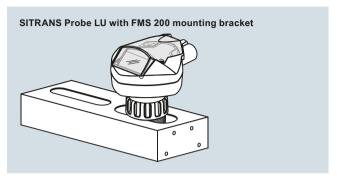
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions for HART/mA device	Article No.
English	A5E32337695
French	7ML1998-5HT11
German Note: The Operating Instructions should be ordered as a separate item on the order.	A5E34957881
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32168031
Operating Instructions for PROFIBUS PA device	
English	A5E32337708
German Note: The Operating Instructions should be ordered as a separate item on the order.	A5E34957884
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32081626
Accessories	
Handheld programmer, Intrinsically Safe, EEx ia	7ML5830-2AH
Handheld programmer, General Purpose approvals	7ML1830-2AN
Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA	7ML5830-2AJ
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
2" NPT locknut, plastic	7ML1830-1DT
2" BSPT locknut, plastic	7ML1830-1DQ
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
One General Purpose polymeric cable gland M20x1.5, rated for -20 +80 °C (-4 +176 °F)	7ML1930-1AM
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
Probe LU, rock guard/sunshield kit, 304 stainless steel	7ML1930-1GH
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch see point level measurement section.	
Spare Parts	
Plastic lid	7ML1830-1KB

Continuous level measurement - Ultrasonic transmitters

### SITRANS Probe LU

### Options

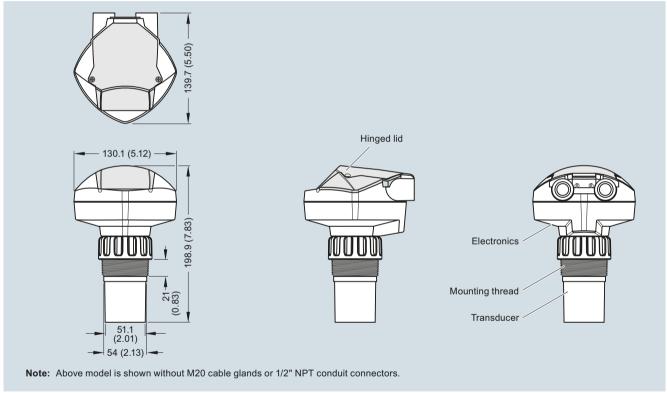




SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with optional mounting bracket

#### Dimensional drawings

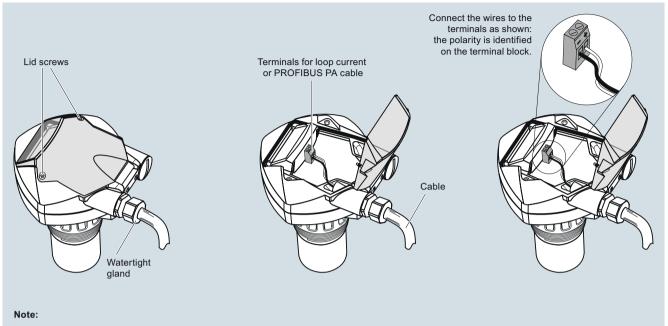


SITRANS Probe LU, dimensions in mm (inch)

Continuous level measurement - Ultrasonic transmitters

### SITRANS Probe LU

### Schematics



- HART model above is shown with M20 cable glands. 1/2" NPT threaded connection is also available.
- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
  Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LU connections

#### Continuous level measurement - Ultrasonic transmitters

The Probe

### Overview



The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

#### Benefits

- Easy to install, program and maintain
- · Accurate and reliable
- Sanitary models available
- Sonic Intelligence echo processing
- Integral temperature compensation

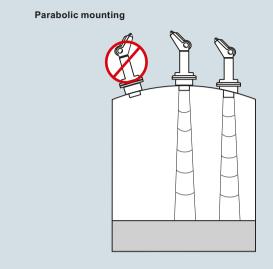
#### Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

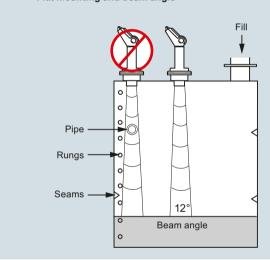
The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

 Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

### Configuration



Flat mounting and beam angle



The Probe mounting

### Continuous level measurement - Ultrasonic transmitters

#### The Probe

Technical specifications	
--------------------------	--

	Three-wire version	Two-wire version		
	Tillee-wire version	(standard)		
Mode of operation				
Measuring principle	Ultrasonic level measurement	Ultrasonic level measurement		
Input				
Measuring range	0.25 5 m (0.8 16.4 ft)	0.25 5 m (0.8 16.4 ft)		
Frequency	54 kHz	54 kHz		
Output				
mA • Span	4 20 mA Proportional/ inversely proportional	4 20 mA Proportional/ inversely proportional		
Max. load	750 Ω at 24 V DC	600 $\Omega$ in the loop at 24 V DC		
Relay	For level alarm or fault	No		
Power supply				
Supply voltage	18 30 V DC, max. 0.2 A	12 30 V DC, 0.1 A surge		
Max. power consumption	5 W (200 mA at 24 V DC)	0.75 W (25 mA at 24 V DC)		
Certificates and approvals	CE, RCM, CSA <sub>US/C</sub> , FM	CE, RCM, CSA <sub>US/C</sub>		
Accuracy				
Error in measurement	0.25 % of measu	ıring range (in air)		
Resolution	3 mm (0.125 inch)			
Temperature compensation	Built in			
Echo processing	Sonic Intelligence			
Rated operation conditions				
Beam angle	1	2°		
Ambient temperature  • Standard  • Matallia maunting	-40 +60 °C (-40 +140 °F) -20 +60 °C (-4 +140 °F)			
<ul> <li>Metallic mounting</li> <li>Max. static operating</li> </ul>		pheric pressure		
pressure	Normal atmos	priorio prossuro		
Degree of protection	IF	P65		
Design				
<ul><li>Weight</li><li>Without flange adapter</li><li>With flange adapter</li></ul>	1.5 kg (3.3 lb) 1.7 kg (3.7 lb)			
Material • Electronics enclosure • Transducer				
Degree of protection	IF	<sup>2</sup> 65		
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]			
Flange adapter	3" Universal, (fits DN 65, PN 10 and 3"ASME) 4" sanitary			
Cable inlet	2 inlets for PG 16 or ½" NPT cable glands			

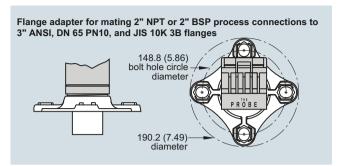
Selection and Ordering data		Ar	tic	le No.
The Probe		71	IL.	1201-
Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels			1	0 0
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.				
Measuring range 5 m (16.40 ft)	•	1		
Transducer/Process connection				
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]	•	ı	•	
PVDF copolymer, R 2" [(BSPT), EN 10226]	•	1	F	
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]			3	
PVDF copolymer, 4" Sanitary mounting		•	J	
Model/Approval				
3 Wire, 24 V DC, CE, RCM, CSA, FM	•		E	
2 Wire, 24 V DC, CE, RCM, CSA	-		F	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

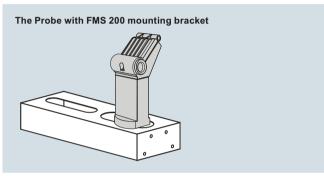
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
Additional Operating Instructions	Article No.
3 Wire, 24 V model, Multi-language manual	7ML1998-5GD62
2 Wire model, Multi-language manual	A5E32243983
Accessories	
Universal Box Bracket Mounting kit	7ML1830-1BK
Sanitary 4" mounting clamp	7ML1830-1BR
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" NPT locknut, plastic	7ML1830-1DT
2" BSPT locknut, plastic	7ML1830-1DQ
Plastic M20 cable gland with metal locknut	7ML1930-1DB
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch see point level measurement section.	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### Options

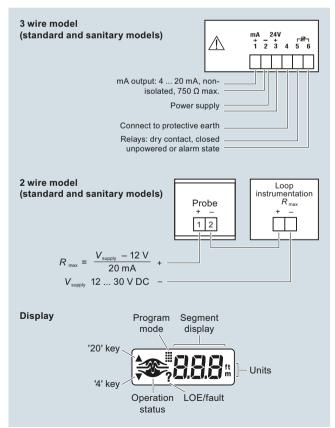


The Probe Optional Flange Adapter, dimensions in mm (inch)



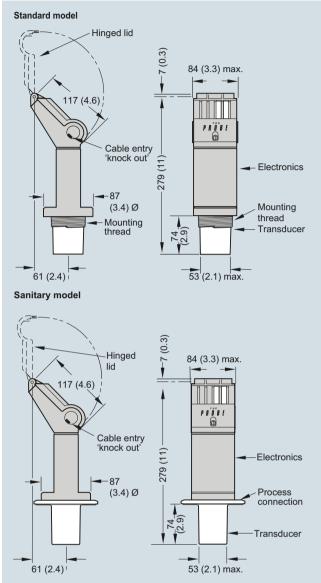
The Probe with Optional Mounting Bracket

#### Schematics



The Probe connections

### Dimensional drawings



The Probe, dimensions in mm (inch)

Continuous level measurement - Ultrasonic controllers

#### SITRANS LUT400 series

#### Overview



The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.

#### Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- · Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive webbased interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- · Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

#### Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

# Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

# Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 60 m (1 196 ft), transducer dependent
Input	
Discrete	0 50 V DC switching level Logical $0 \le 10$ V DC Logical $1 = 10$ 50 V DC Max. 3 mA
Output	
Transducer frequency	10 52 kHz
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series transducers
Relays	1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC     2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC
mA output	4 20 mA, isolated
Max. load	600 $\Omega$ max. in ACTIVE mode, 750 $\Omega$ max. in PASSIVE mode
Resolution	0.1 % of range
Accuracy	
Error in measurement	Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance     High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range
Resolution	Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range
Temperature compensation	-40 +150 °C (-40 +300 °F)     Integral temperature sensor in transducer     External TS-3 temperature sensor (optional)     Programmable fixed temperature values
Rated operating conditions	
Installation conditions  Location  Installation category Pollution degree	Indoor/outdoor II 4
Ambient conditions • Ambient temperature (enclosure)	-20 +50 °C (-4 +122 °F)

Design	
Weight	101 (007 !!)
<ul><li>Enclosure with display lid</li><li>Enclosure with blank lid:</li></ul>	1.3 kg (2.87 lb) 1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	,
Enclosure with display or blank lid:     Enclosure with blank lid and knock-out removed:	IP65/Type 4X/NEMA 4X IP20
Remote display lid	IP65/Type 3/NEMA 3
Cable	
Transducer and mA output signal	Transducer, mA output: copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 0.75 mm² (22 18 AWG) Relay/power to be copper conductors per local requirements to meet 250 V A contact rating
Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels res- olution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	<ul> <li>PC running SIMATIC PDM</li> <li>PC running Emerson AMS Device Manager</li> <li>PC running a web browser</li> <li>PC running a Field Device Tool (FDT)</li> <li>Field Communicator 375/475 (FC375/FC475)</li> </ul>
Memory	<ul><li>512 kB flash EPROM</li><li>1.5 MByte flash for data logging</li></ul>
Power supply	
AC version	100 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM, UL listed, RCM, MCERTS certified for Open Channel Flow
Hazardous	
Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
Shipping	Lloyd's Register, ABS
Communication	HART 7.0, USB

Continuous level measurement - Ultrasonic controllers

# SITRANS LUT400 series

		SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
Category	Feature	Level Controller	Level, pump and flow controller	High accuracy OCM controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm +0.17 % of measured distance	✓	✓	✓
	High accuracy: ± 1 mm within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
Data logging and	HART communications	✓	✓	✓
communications	4 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging triggered by changes in flow condition			<b>√</b>
	Daily data logging for maxi- mum, minimum and average flow, daily totalized volume, and minimum and maximum temperature		<b>✓</b>	<b>✓</b>
Flow monitoring	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		<b>√</b>	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	MCERTS Class 1 Certification			✓
	MCERTS Class 2 Certification		✓	
Pump control	Energy saving algorithms for pump control		<b>√</b>	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		<b>√</b>	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
	Time to spill calculation		✓	✓

## Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

Selection and Ordering data	Art	icle No.
SITRANS LUT420 and LUT430 Compact ultrasonic level controllers for continuous short to long-range level or volume measurement of liquids, slurries, and solids. Both units include basic relay functions for pumps, alarms, and other controls, plus onboard data logging. LUT430 offers additional advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability. Functionality varies by model.  7 Click on the Article No. for the online configura-	7M 0	IL5050-
tion in the PIA Life Cycle Portal.  Model  SITRANS LUT420 - Level controller SITRANS LUT430 - Level, Pump & Flow controller	• A	
Enclosure display options With display With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)] No display (blank lid provided) Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to	•	A B C
IEC 60715, EN 60715  Input voltage  100 230 V AC ± 15 %  10 32 V DC  Cable inlet	•	1 2
3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	i	1 2
Number of measurement points Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	•	1
Communications and I/O HART, 2 discrete inputs, 3 relays	•	D
Approvals General purpose CE, FM, CSA <sub>US/C</sub> , UL, RCM Hazardous locations CSA Class I, II, III, Div. 2 (Groups A, B, C, D, F, G)	•	A C

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code		
Further designs			
Please add "-2" to Article No. and specify Order code(s).			
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000   ■	C11		
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters) specify in plain text	Y15		
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	N07		
Operating Instructions	Article No.		
English	A5E33329501		
French	7ML1998-5MV11		
Spanish	7ML1998-5MV21		
German	A5E35690863		
Italian	7ML1998-5MV51		
Multi-language compact operating instructions Note: The operating instructions should be ordered as a separate line item on the order.	7ML1998-5XU81		

Selection and Ordering data	Article No.
Communications Manual	
English	A5E33701270
French	7ML1998-5NE11
Spanish	7ML1998-5NE21
German	7ML1998-5NE31
Italian	7ML1998-5NE51
Note: The communications manual should be ordered as a separate line item on the order.	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
TS-3 Temperature Sensor - see TS-3 on page 4/189	7ML1813
Panel mount cable extension, 2.5 m (8.2 ft)	7ML1930-1GF
Qty 3 cable glands and retaining nuts	7ML1930-1GB
USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B	7ML1930-1GD
Hart modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Sunshield, 304 stainless steel	7ML1930-1GE
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	7ML1830-1PA
Terminal block replacement kit (5 piece kit with one of each removable terminal)	7ML1830-1PB
Wall/Pipe mount plate	7ML1830-1PC
Enclosure (include blank label)	7ML1830-1PD
SITRANS LUT400 Lid (with Display)	7ML1830-1PE
SITRANS LUT400 Lid (blank)	7ML1830-1PF
Fuse - AC (0.25 A, 250 V, Slow Blow)	7ML1830-1PG
Fuse - DC (1.6 A, 125 V, Slow Blow)	7ML1830-1PH
Battery BR2032	7ML1830-1PJ
Panel mount gasket and fastener kit	7ML1830-1PK
DIN-rail clip	7ML1830-1PL

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

Selection and Ordering data		Arti	icle	No	Ο	
SITRANS LUT440 The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.		7M 0 ■				
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.						
<b>Model</b> SITRANS LUT440 - High accuracy Open Channel Monitor <sup>1)</sup>	•	С				
Enclosure display options						
With display	•		A			
With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)]	•		В			
No display (blank lid provided)  Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715	•		С			
Input voltage						
100 230 V AC ± 15 %	•		ľ			
10 32 V DC			1	2		
<b>Cable inlet</b> 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	•			1 2		
Number of measurement points Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	•				1	
Communications and I/O HART, 2 discrete inputs, 3 relays	•					)
Approvals General purpose CE, FM, CSA <sub>US/C</sub> , UL, RCM Hazardous locations CSA Class I, II, III, Div. 2, (Groups A, B, C, D, F, G)	•					A C

- 1) Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ■ Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	N07
Operating Instructions	Article No.
English	A5E33329501
French	7ML1998-5MV11
Spanish	7ML1998-5MV21
German	A5E35690863
Italian	7ML1998-5MV51
Note: The operating instructions should be	

Selection and Ordering data	Article No.
Communications Manual	
English	A5E33701270
French	7ML1998-5NE11
Spanish	7ML1998-5NE21
German	7ML1998-5NE31
Italian	7ML1998-5NE51
Note: The communications manual should be ordered as a separate line item on the order.	
Accessories	
Tag, stainless steel, $12 \times 45 \text{ mm}$ (0.47 $\times$ 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
TS-3 Temperature Sensor - see TS-3 on page 4/189	7ML1813
Panel mount cable extension 2.5 m (8.2 ft)	7ML1930-1GF
Qty 3 cable glands and retaining nuts	7ML1930-1GB
USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B	7ML1930-1GD
HART modem/USB (for use with PC and SIMATIC PDM)	7MF4997-1DB
Sunshield, 304 stainless steel	7ML1930-1GE
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	7ML1830-1PA
Terminal block replacement kit (5 piece kit with one of each removable terminal)	7ML1830-1PB
Wall/Pipe mount plate	7ML1830-1PC
Enclosure (include blank label)	7ML1830-1PD
SITRANS LUT400 Lid (with Display)	7ML1830-1PE
SITRANS LUT400 Lid (blank)	7ML1830-1PF
Fuse - AC (0.25 A, 250 V, Slow Blow)	7ML1830-1PG
Fuse - DC (1.6 A, 125 V, Slow Blow)	7ML1830-1PH
Battery BR2032	7ML1830-1PJ
Panel mount gasket and fastener kit	7ML1830-1PK
DIN-rail clip	7ML1830-1PL

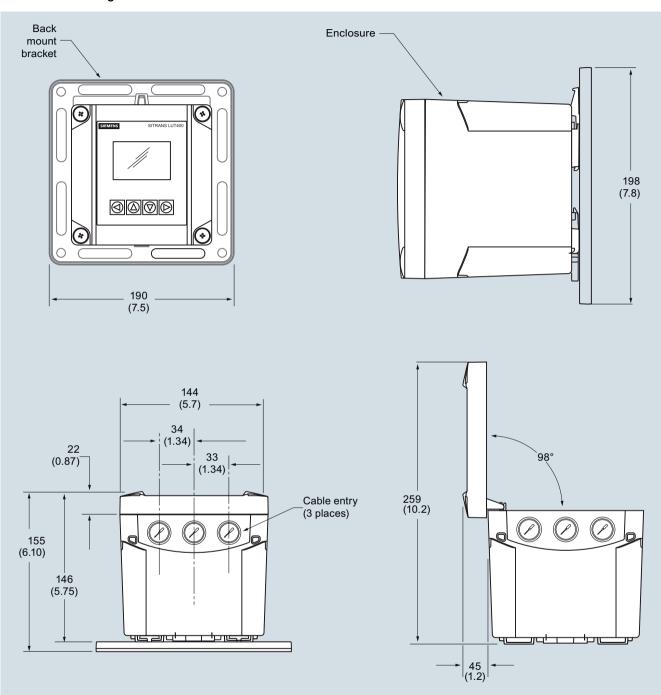
■ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
■. For details see page 9/5 in the appendix

ordered as a separate line item on the order.

Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

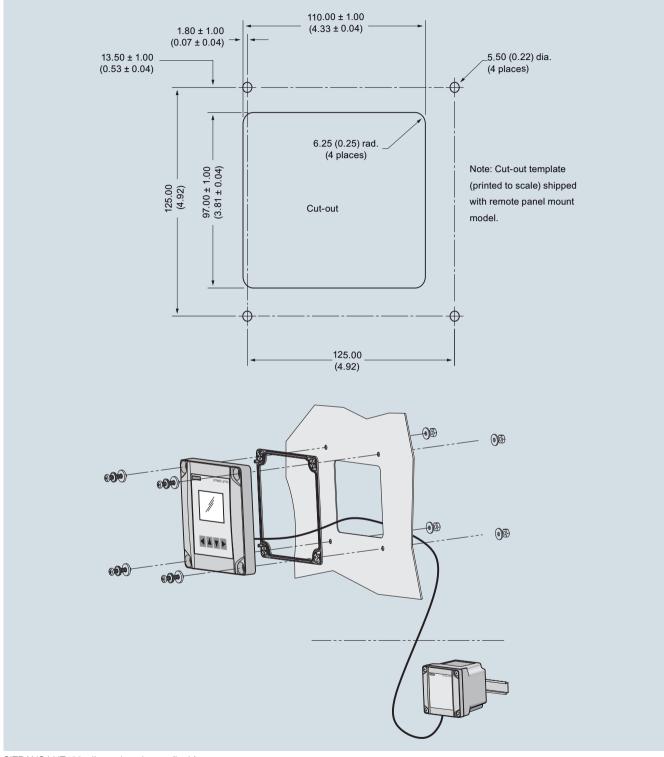
# Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

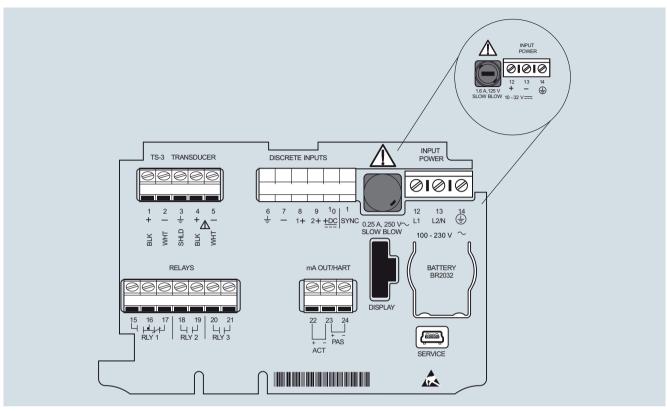


SITRANS LUT400, dimensions in mm (inch)

Continuous level measurement - Ultrasonic controllers

### SITRANS LUT400 series

# Schematics



SITRANS LUT400 connections

Continuous level measurement - Ultrasonic controllers

#### MultiRanger 100/200

#### Overview



MultiRanger is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

#### Benefits

- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- MultiRanger 100: level measurements, simple pump control, and level alarm functions
- MultiRanger 200: level, volume and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

### Application

MultiRanger can be used on different materials, including fuel oil, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and setup. MultiRanger features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 100 offers cost-effective level alarming, as well as on/off and alternating pump control. MultiRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that can be used in hostile environments at temperatures as high as 145 °C (293 °F).

 Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

## Design

The MultiRanger is available in wall or panel mounting options.

### Continuous level measurement - Ultrasonic controllers

### MultiRanger 100/200

# Technical specifications

Ultrasonic level measurement
0.3 15 m (1 50 ft)
1 or 2
$0 \dots 20 \ \text{mA}$ or $4 \dots 20 \ \text{mA},$ from alternate device, scalable
10 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 50 V DC Max. 3 mA
44 kHz
Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Rating 5 A at 250 V AC, non-inductive 1 SPST Form A
2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
0 20 mA or 4 20 mA 750 $\Omega$ , isolated 0.1 % of range
0.25 % of range or 6 mm (0.24 inch), whichever is greater
0.1 % of measuring range <sup>1)</sup> or 2 mm (0.08 inch), whichever is greater
-50 +150 °C (-58 +302 °F)     Integral temperature sensor     External TS-3 temperature sensor (optional)     Programmable fixed temperature values
Indoor/outdoor
4
-20 +50 °C (-4 +122 °F)

Design	
Weight  • Wall mount  • Panel mount	1.37 kg (3.02 lb) 1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)  • Wall mount  • Panel mount	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Electrical connection  Transducer and mA output signal  Max. separation between transducer	2-core copper conductor, twisted, shielded, 0.5 0.75 mm² (22 18 AWG), Belden 8760 or equivalent is acceptable 365 m (1 200 ft)
and transceiver	100 v 40 mm (4 v 1 5 inch) multi
Displays and controls	100 x 40 mm (4 x 1.5 inch) multi- block LCD with backlighting
Programming	Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
Power supply	
AC version	100 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 30 V DC (20 W)
Certificates and approvals	CE, RCM <sup>2)</sup> Lloyd's Register of Shipping ABS Type Approval FM, CSA <sub>US/C</sub> , UL listed CSA Class I, Div. 2, Groups A, B, C and D, Class II, Div.2, Groups F and G, Class III (wall mount only), ATEX II 3D
Communication	RS 232 with Modbus RTU or ASCII via RJ-11 connector RS 485 with Modbus RTU or ASCII via terminal strips Optional: SmartLinx cards for - PROFIBUS DP - DeviceNet

- 1) Program range is defined as the empty distance to the face of the transducer plus any range extension
- 2) EMC performance available on request

### Continuous level measurement - Ultrasonic controllers

### MultiRanger 100/200

Selection and Ordering data			e N		
MultiRanger 100/200  Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries           Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			5033	-	
Versions MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow and differential measurements	1 2			Ī	
Mounting, enclosure design Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA <sub>USIC</sub> , FM, UL)	, I	A B C			
Power supply 100 230 V AC 12 30 V DC		A B			
Number of measurement points Single point version Dual point version			0 1		
Communication (SmartLinx) Without module SmartLinx PROFIBUS DP module SmartLinx DeviceNet module See SmartLinx product on page 4/362 for more information.			0 2 3		
Output relays 3 relays (2 Form A, 1 Form C), 250 V AC 6 relays (4 Form A, 2 Form C), 250 V AC 1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)	,			1 2 3	
Approvals General Purpose CE, FM, CSA <sub>USIC</sub> , UL listed, RCM CSA Class I, Div. 2, Groups A, B, C and D; Class II,   Div. 2, Groups F and G; Class III <sup>1</sup> )				A B	
ATEX II 3D <sup>2)</sup>				С	

<sup>1)</sup> For wall mount applications only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code		
Further designs			
Please add "-Z" to Article No. and specify Order code(s).			
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ■ Measuring-point number/identification (max. 27 characters) specify in plain text	Y15		
Operating Instructions	Article No.		
English	7ML1998-5FB06		
French	7ML1998-5FB13		
Spanish	7ML1998-5FB23		
German	7ML1998-5FB36		
Quick Start guide, multi-language Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5QD83		
Other Operating Instructions			
SmartLinx PROFIBUS DP, English	7ML1998-1AQ03		
SmartLinx PROFIBUS DP, German	7ML1998-1AQ33		
SmartLinx PROFIBUS DP, French	7ML1998-1AQ13		
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	7ML1998-1BH02		
Accessories			
Handheld programmer	7ML1830-2AK		
Tag, stainless steel, $12 \times 45 \text{ mm}$ (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC		
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	7ML1930-1FV		
Sunshield kit, 304 stainless steel	7ML1930-1GA		
SITRANS RD100, loop powered display - see Chapter 7	7ML5741		
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740		
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744		
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750		
Spare parts			
Power Supply Board (100 230 V AC)	7ML1830-1MD		
Power Supply Board (12 30 V DC)	7ML1830-1ME		
Display Board	7ML1830-1MF		

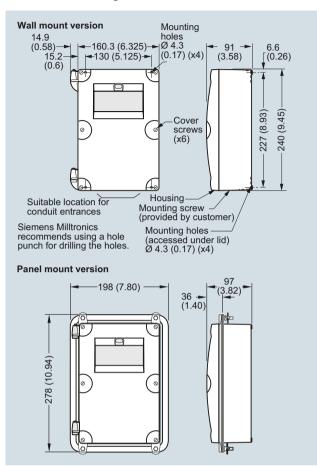
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 For details see page 9/5 in the appendix.

<sup>&</sup>lt;sup>2)</sup> For standard enclosure wall mount, option A only

Continuous level measurement - Ultrasonic controllers

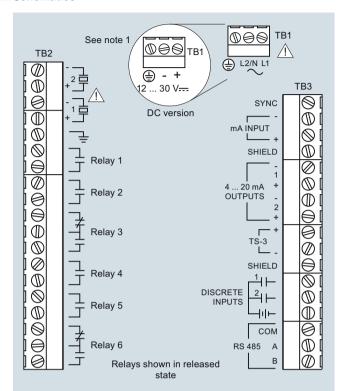
MultiRanger 100/200

### Dimensional drawings



MultiRanger, dimensions in mm (inch)

### Schematics



#### Note:

- Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
- 2. Verify that all system components are installed in accordance with instructions.
- Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
- Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger connections

Continuous level measurement - Ultrasonic controllers

#### HydroRanger 200

#### Overview



HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

#### Benefits

- · Monitors wet wells, weirs and flumes
- Digital communications with built-in Modbus RTU via RS 485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- 6 relay (standard), 1 or 3 relay (optional)
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

#### Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet to-day's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

• Key Applications: wet wells, flumes/weirs, bar screen control

### Continuous level measurement - Ultrasonic controllers

### HydroRanger 200

# Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 15 m (1 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 20 mA or 4 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays <sup>1)</sup> • Model with 1 relay <sup>2)</sup> • Model with 3 relays <sup>2)</sup> • Model with 6 relays	Rating 5 A at 250 V AC, non-inductive 1 SPST Form A 2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
mA output  • Max. load  • Resolution	$0 \dots 20$ mA or $4 \dots 20$ mA 750 $\Omega_{\rm s}$ isolated 0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater <sup>3)</sup>
Temperature compensation	-50 +150 °C (-58 +302 °F)     Integral temperature sensor in transducer     External TS-3 temperature sensor (optional)     Programmable fixed temperature values
Rated operating conditions	
Installation conditions  • Location  • Installation category  • Pollution degree	Indoor / outdoor II 4
Ambient conditions • Ambient temperature (enclosure)	-20 +50 °C (-4 +122 °F)

Design	
Weight  • Wall mount  • Panel mount	1.37 kg (3.02 lb) 1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)  • Wall mount  • Panel mount	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Cable Transducer and mA output signal Max. separation between transducer and transceiver	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm <sup>2</sup> (18 AWG), Belden 8 760 or equivalent is acceptable 365 m (1 200 ft)
Displays and controls	100 x 40 mm (4 x 1.5 inch) multi- block LCD with backlighting
Programming	Programming using handheld pro- grammer or via PC with SIMATIC PDM software
Power supply <sup>4)</sup>	
AC version	100 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 30 V DC (20 W)
Certificates and approvals	CE, RCM <sup>5)</sup> Lloyd's Register of Shipping ABS Type Approval FM, CSA <sub>US/C</sub> , UL listed CSA <sub>US/C</sub> Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only) MCERTS Class 3 approved for Open Channel Flow
Communication	RS 232 with Modbus RTU or ASCII via RJ-11 connector RS 485 with Modbus RTU or ASCII via terminal blocks Optional: SmartLinx cards for PROFIBUS DP DeviceNet
4)	

- 1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays
- 2) This model is level control only; no open channel flow, differential level or volume conversion functions
- <sup>3)</sup> Program range is defined as the empty distance to the face of the transducer plus any range extension
- 4) Maximum power consumption is listed
- 5) EMC performance available upon request

# Continuous level measurement - Ultrasonic controllers

### HydroRanger 200

Selection and Ordering data	Article No.
Siemens HydroRanger 200 Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from number of measurement points options below.	7ML5034-
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Mounting Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount <sup>1)</sup>	1 2 3
Power supply 100 230 V AC 12 30 V DC	A B
Number of measurement points Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay <sup>2)</sup> Single point model, level only, 3 relays <sup>2)</sup>	A B C D
Communication (SmartLinx) Without module SmartLinx PROFIBUS DP module	0 2
SmartLinx DeviceNet module See SmartLinx product on page 4/362 for more information.	3
Approvals  General Purpose CE, FM, CSA <sub>USIC</sub> , UL listed, RCM CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III (for wall mount applications only)	1 2

<sup>1)</sup> Available with approval option 1 only

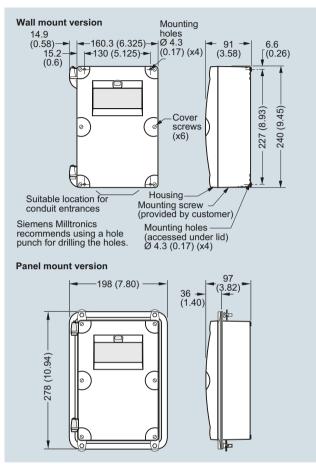
<sup>2)</sup> This model is level control only; no open channel flow, differential level, or volume conversion functions.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
English	7ML1998-5FC03
French	7ML1998-5FC11
German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	7ML1998-5FC33
Other Operating Instructions	
SmartLinx PROFIBUS DP, English	7ML1998-1AQ03
SmartLinx PROFIBUS DP, German	7ML1998-1AQ33
SmartLinx PROFIBUS DP, French	7ML1998-1AQ13
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	7ML1998-1BH02
Accessories	
Handheld programmer	7ML1830-2AK
Tag, stainless steel, $12 \times 45 \text{ mm}$ (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
Sunshield kit, 304 stainless steel	7ML1930-1GA
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
Spare parts	
Power Supply Board (100 230 V AC)	7ML1830-1MD
Power Supply Board (12 30 V DC) Display Board	7ML1830-1ME 7ML1830-1MF

Continuous level measurement - Ultrasonic controllers

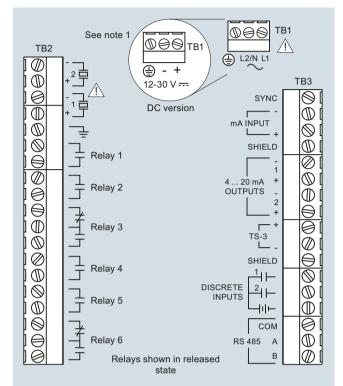
HydroRanger 200

### Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

### Schematics



#### Notes

- Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft.). Route cable in grounded metal conduit, separate from other cables.
- 2. Verify that all system components are installed in accordance with instructions.
- 3. Connect all cable shields to the HydroRanger 200 shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
- Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 connections

Continuous level measurement - Ultrasonic controllers

#### SITRANS LU01 and LU02

#### Overview



The SITRANS LU01 is an ultrasonic long-range level controller for liquids and solids in a single vessel up to 60 m (200 ft). Handheld programmer shown is an accessory and must be ordered separately.

#### Benefits

- Single point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all EchoMax transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- High/low alarms

#### Application

The system consists of a SITRANS LU01 monitor linked to a non-contacting ultrasonic transducer that can be mounted up to 365 m (1 200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features Sonic Intelligence echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

 Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets

#### Overview



The SITRANS LU02 is a dual point ultrasonic long-range level controller for liquids and solids in one or two vessels up to 60 m (200 ft). Handheld programmer shown is an accessory and must be ordered separately.

#### Benefits

- Dual point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all EchoMax transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- High/low alarms

### Application

SITRANS LU02 will measure liquids, solids or a combination of both in one or two vessels of different sizes, shapes and configurations up to 60 m (200 ft).

The system uses ultrasonic technology to measure level, space, distance, volume or average/differential. It features Sonic Intelligence echo processing software for superior reliability. Transducers can be mounted up to 365 m (1 200 ft) from the monitor.

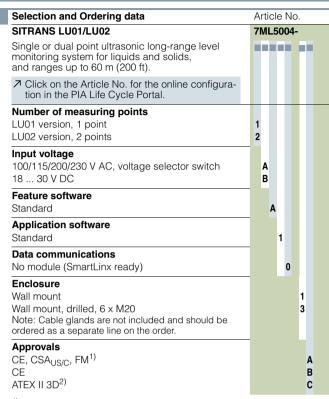
Readings are displayed in user-selectable linear engineering units on the backlit LCD.

 Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets, tripper car

#### Continuous level measurement - Ultrasonic controllers

#### SITRANS LU01 and LU02

Technical specifications	
Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 60 m (1 200 ft)
Measuring points	SITRANS LU01: Max. one point;
Wedgering points	SITRANS LU02: Max. two points
Output signal	
Ultrasonic transducer	EchoMax series, ST-H transducers
Relays	4 SPDT Form C relays, rated at 5 A at 250 V AC, resistive load
mA output	0/4 20 mA, optically isolated
<ul><li>Max. load</li><li>Resolution</li></ul>	750 Ω, isolated, 30 V 0.1 % of range
• Outputs	SITRANS LU01: Max. one mA output SITRANS LU02: Max. two mA outputs
Accuracy	·
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater
Temperature compensation	-50 +150 °C (-58 +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional)
	Programmable fixed temperature
Rated operating conditions	
Ambient conditions  • Ambient temperature for enclosure	-20 +50 °C (-4 +122 °F)
Design	
Weight	2.7 kg (6 lb)
Material (enclosure)	Polycarbonate
Degree of protection (wall mount)	IP65
Electrical connection	
Ultrasonic transducer cable extension	RG62-A/U coaxial cable with low capacitance
mA output signal	2-core copper conductor, twisted, shielded, 0.5 0.75 mm <sup>2</sup> (22 18 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Synchronization	Up to 16 LU01/LU02 units can be synchronized together
Power supply	
AC model	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
DC model	18 30 V DC, 25 W
Displays and controls	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	CE, CSA <sub>US/C</sub> , FM, ATEX II 3D Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)
Options	
External temperature sensor	TS-3
Communications	Dolphin Plus: Siemens Windows- compatible interface and ComVerter link (infrared)



- 1) Available with enclosure option 1 only
- 2) Available with enclosure option 3 only

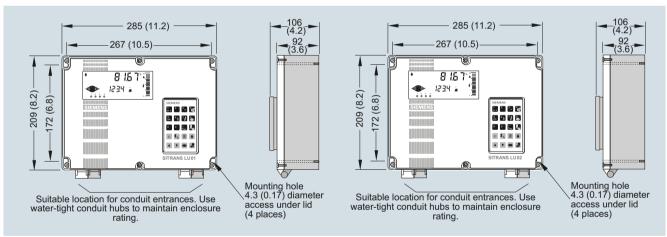
Continuous level measurement - Ultrasonic controllers

### **SITRANS LU01 and LU02**

Selection and Ordering data	Order code	Selection and Ord
Further designs		Accessories
Please add "-Z" to Article No. and specify Order code(s).		Handheld program
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification	Y15	Tag, stainless stee one text line, suital
(max. 27 characters) specify in plain text		M20 cable gland k
Operating Instructions	Article No.	6 M20 nuts, 3 stop
SITRANS LU01		M20 cable gland k 4 M20 nuts, 4 wasl
English	7ML1998-5BE02	TS-3 Temperature
French	7ML1998-5BE12	Sunshield kit, 304
German	7ML1998-5BE32	Spare parts
SITRANS LU02		Card, LU01 mothe
English	7ML1998-5BD02	Card, LU02 mothe
French	7ML1998-5BD12	
German	7ML1998-5BD32	Card, LU02 daugh
	7 WIL 1990-3DD32	Card, LU01 daugh
Note: The Operating Instructions should be ordered as a separate line item.  This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		Card, display See SmartLinx pro more information.

Selection and Ordering data	Article No.
Accessories	
Handheld programmer	7ML1830-2AN
Tag, stainless steel, $12 \times 45 \text{ mm}$ (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	7ML1830-1GM
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	7ML1930-1FV
TS-3 Temperature Sensor - see TS-3 on page 4/189	7ML1830-2AN
Sunshield kit, 304 stainless steel	7ML1930-1GA
Spare parts	
Card, LU01 mother main, AC, comm ready	7ML1830-1KX
Card, LU02 mother main, AC, comm ready	7ML1830-1MA
Card, LU02 daughter, comm ready	7ML1830-1LP
Card, LU01 daughter, comm ready	7ML1830-1LN
Card, display See SmartLinx product page 4/362 for more information.	7ML1830-1LQ

#### Dimensional drawings

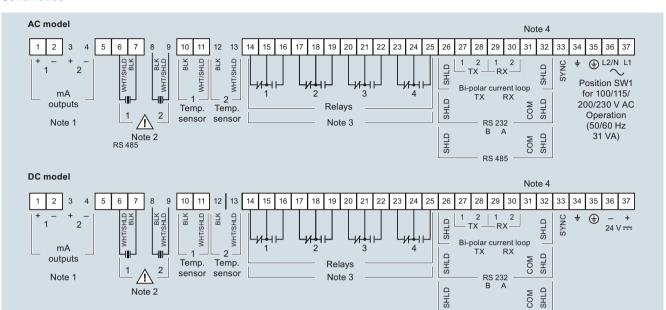


Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right), dimensions in mm (inch)

Continuous level measurement - Ultrasonic controllers

#### SITRANS LU01 and LU02

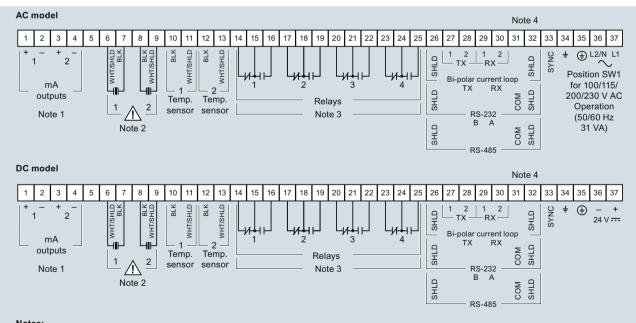
#### Schematics



#### Notes:

- 1. Optically isolated, 750  $\Omega$  max. load
- 2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1 200 ft). Run in grounded metal conduit, separate from other wiring.
- 3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
- 4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm<sup>2</sup>) wire.

#### SITRANS LU01 connections



#### Notes:

- 1. Optically isolated, 750 Ω max. load
- 2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1 200 ft). Run in grounded metal conduit, separate from other wiring.
- 3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
- 4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.

Continuous level measurement - Ultrasonic controllers

#### **SITRANS LU10**

#### Overview



SITRANS LU10 is an ultrasonic long-range level monitor for liquids and solids, offering 10-point monitoring in a single unit. Handheld programmer shown is an accessory and must be ordered separately.

### Benefits

- Ten point, long-range level monitoring
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- Backlit LCD display with reading in standard engineering units
- Easy to install, easy to program using removable infrared keypad (optional)

#### Application

It can be used in a wide range of applications to scan liquids, solids or a combination of both contained in vessels of differing size, shape, and configuration up to 60 m (200 ft).

SITRANS LU10 uses ultrasonic technology to measure level, space, distance, volume, or average/differential. Transducers can be mounted up to 365 m (1 200 ft) from the monitor. The SITRANS LU10 features Sonic Intelligence echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

Key Applications: chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets, tank farms

# Continuous level measurement - Ultrasonic controllers

### SITRANS LU10

# Technical specifications

Ultrasonic level measurement	
Max. 0.3 60 m (1 200 ft)	
Max. 10	
EchoMax series, ST-H transducers	
SPDT Form C relays, rated 5 A at 250 V AC, resistive load	
SITRANS LU AO module (option): 0/4 20 mA, optically isolated	
750 Ω, isolated	
0.1 % of range	
0.25 % of range or 6 mm (0.24 inch), whichever is greater	
0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater	
-50 +150 °C (-58 +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (expandable to 10 inputs with optional TIB-9 card) • Programmable fixed temperature	
-20 +50 °C (-4 +122 °F)	
2.7 kg (6 lb)	
Polycarbonate	
IP65/Type 4X/NEMA 4X	
IP65/Type 4X/NEMA 4X	
RG62-A/U coaxial cable with low capacitance	
RG62-A/U coaxial cable with low	
RG62-A/U coaxial cable with low capacitance 2-core copper conductor, twisted, shielded, 0.5 0.75 mm² (22 18 AWG), Belden 8760 or	

Power supply	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
Displays and controls	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	CE, RCM, FM, CSA <sub>US/C</sub> , ATEX II 3D     Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)
Options	
Expansion card	TIB-9, increases the number of TS-3 inputs from 1 10
External temperature sensor	TS-3
Communications	Dolphin Plus: Siemens Windows- compatible interface and ComVerter link (infrared)
I/O devices	Max. 3 I/O devices per SITRANS LU10     SITRANS LU AO analog output module (max. 1)

# Continuous level measurement - Ultrasonic controllers

# SITRANS LU10

Selection and Ordering data	Article No.
SITRANS LU10 Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft).  Click on the Article No. for the online configura-	7ML5007-
tion in the PIA Life Cycle Portal.	
Input voltage 100/115, 200/230 V AC, selectable	1
Feature software Standard	A
Application software Standard	A
Data communications No module (SmartLinx ready)	0
TIB-9 temperature card None With TIB-9 card	0
Enclosure Wall mount Wall mount, drilled, 12 x M20 x1.5 for cable glands Note: Cable glands are not included and should be ordered as a separate line on the order.	1 2
Approvals CE, CSA <sub>US/C</sub> , FM <sup>1)</sup> ATEX II 3D <sup>1)</sup> CE, RCM <sup>2)</sup>	A B D

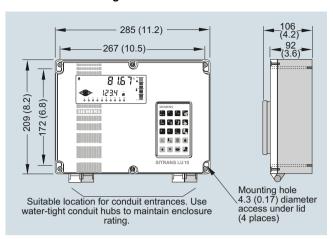
Available with enclosure option 1 only
 Available with enclosure option 2 only

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
English	7ML1998-5AN02
French	7ML1998-5AN12
German	7ML1998-5AN32
Accessories	
Handheld programmer	7ML1830-2AN
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
Temperature Card TIB 9-card	7ML1830-1CN
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	7ML1830-1GM
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	7ML1930-1FV
TS-3 Temperature Sensor - see TS-3 on page 4/189	
Sunshield kit, 304 stainless steel	7ML1930-1GA
Spare parts	
Card, mother main, AC, comm ready	7ML1830-1ML
Card, daughter, comm ready	7ML1830-1LY
Card, display See SmartLinx product on page 4/362 for more information.	7ML1830-1LQ

Continuous level measurement - Ultrasonic controllers

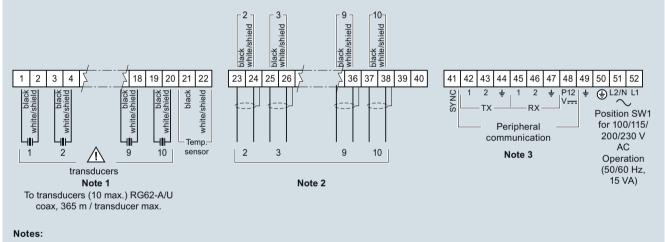
**SITRANS LU10** 

## Dimensional drawings



SITRANS LU10, dimensions in mm (inch)

#### Schematics



- 1. Transducer cables must be run in a grounded metal conduit separate from other wiring (except TS-3 temperature sensor wiring, if applicable).
- 2. Optional TIB-9 card for multiple temperature sensors. Do not jump the terminals if TS-3s are not used.
- 3. The SITRANS LU10 is compatible with the following Siemens Milltronics peripherals:
  - SITRANS LU AO analog output module

SITRANS LU10 connections

Continuous level measurement - Ultrasonic controllers

#### SITRANS LU AO

### Overview



The SITRANS LU AO Analog Output Module provides remote analog output for the measurement points of the SITRANS LU10 level monitor.

#### Benefits

- Analog outputs can be up to 1 500 m (5 000 ft) from the SITRANS LU 10
- Analog outputs can be per transducer and/or average of 2 or more

#### Application

The operation of the SITRANS LU AO is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

The SITRANS LU AO can provide up to 10 analog outputs (each sharing a common negative bus which is electrically isolated from ground).

### Technical specifications

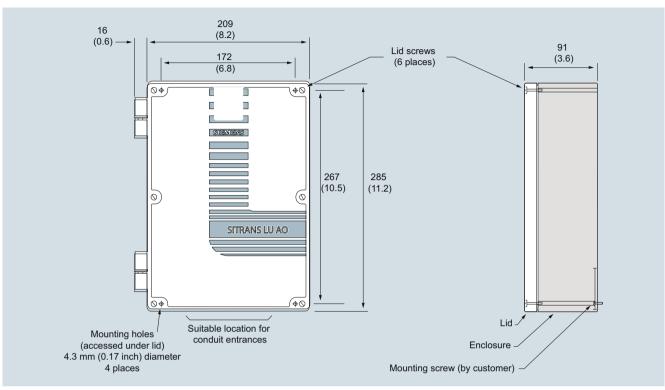
Mode of operation	
Input	
Communications	Data from SITRANS LU10
Transmission rate	4 800 bits/s
Voltage	± 20 mA bipolar current loop
Polarization	Non-polarized
Max. load	1 receiving unit
Output	
Analog outputs	10 analog outputs, programmable from SITRANS LU10
	0 or 4 20 mA, isolated
<ul><li>± 20 mA bipolar current loop</li><li>Max. load</li><li>Resolution</li></ul>	Input and transmission 750 $\Omega$ 0.1 %
Rated operating conditions	
Ambient conditions  • Ambient temperature for enclosure  • Location  • Installation category  • Pollution degree	-20 +50 °C (-5 +122 °F) Indoor/outdoor II 4
Design	
Weight	2 kg (4.4 lb)
Material (enclosure)	Polycarbonate
Degree of protection • Cable connection	Type 4X/NEMA 4X/IP65 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 0.75 mm² (22 18 AWG)
<ul> <li>Electrical connection and relay connection</li> </ul>	Copper conductor according to local requirements, rated 250 V 5 A
Power supply	100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
Displays and controls	1 LED for display of voltage/ communications state
Certificates and approvals	CE, FM, CSA <sub>US/C</sub> , RCM

Selection and Ordering data	Article No.
SITRANS LU AO Provides remote analog output for the measurement points of the SITRANS LU10 level monitor. Approvals: CSA <sub>USIC</sub> , FM, CE, RCM	7ML5810-1A
Operating Instructions	
English	7ML1998-5CE01
German	7ML1998-5CE31
Note: Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the Quick Start and Operating Instructions library.	
Accessories	
Sun Shield, 304 stainless steel	7ML1930-1GA

Continuous level measurement - Ultrasonic controllers

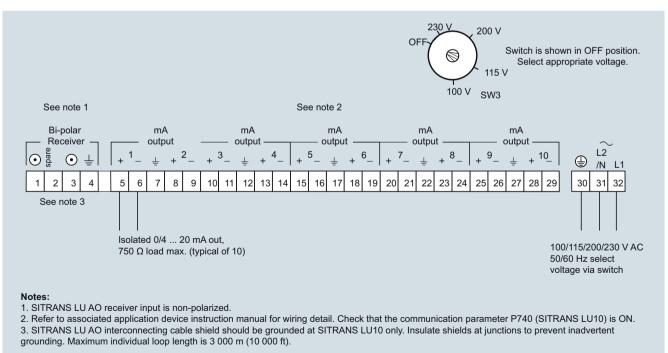
#### SITRANS LU AO

# Dimensional drawings



SITRANS LU AO, dimensions in mm (inch)

### Schematics



SITRANS LU AO connections

Continuous level measurement - Ultrasonic transducers

#### **Ultrasonic transducers**

## Overview

#### **Ultrasonic Transducers**

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

#### Technical specifications

EchoMax Transducers					
	Liquids		Liquids and Solids		
			Standard		
	XRS-5	ST-H	XPS-10	XPS-15	XPS-30
Max. range <sup>1)</sup>	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)
Min. range	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.6 m (2 ft)
Max. temperature	65 °C (149 °F)	73 °C (164 °F)	95 °C (203 °F)	95 °C (203 °F)	95 °C (203 °F)
Min. temperature	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)
Typical Applications	Wet wells and open channels	Chemical storage and liquid tanks	Dusty solids and slurries	Deep wet wells and solids	Powders, pellets and solids
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°
Thread size	R 1" [(BSPT), EN 10226] 1" NPT	1" and 2" NPT R 2" [(BSPT), EN 10226], 2" [(BSPP), EN ISO 228-1]	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT
Enclosure	<ul><li>PVDF Copolymer</li><li>CSM</li><li>Option: Flange with PTFE facing</li></ul>	ETFE     Option: PVDF	PVDF     Option: Foam facing     Flange with PTFE facing	PVDF     Option: Foam facing     Flange with PTFE facing	PVDF     Option: Foam facing     Flange with PTFE facing
Compatible with:					
SITRANS LUT400	•	•	•	•	•
SITRANS LU	•	•	•	•	•
HydroRanger 200	•	•	•	•	
MultiRanger 100/200	•	•	•	•	

<sup>1)</sup> Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult your local Siemens representative for further information.

# Continuous level measurement - Ultrasonic transducers

ST-H

## Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

#### Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

#### Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

• Key Applications: chemical storage, liquid tanks

## Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 10 m (1 33 ft)
Output	
Frequency	44 kHz
Beam angle	12°
Accuracy	
Temperature compensation	Compensated by integral temperature sensor
Rated operating conditions	
Pressure	Normal atmospheric pressure
Ambient conditions • Ambient temperature	-20 +60 °C (-5 +140 °F) (ATEX approved model) -40 +73 °C (-40 +163 °F)
D	(CSA/FM approved model)
Design	(0 !! )
Weight <sup>1)</sup>	1.4 kg (3 lb)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint) <sup>2)</sup>
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Degree of protection	IP68
Cable connection	2-core shielded/twisted, 0.519 mm <sup>2</sup> (20 AWG), PVC sheath
Cable (max. length)	365 m (1 200 ft) with RG 62 A/U coaxial cable
Options	
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Certificates and approvals	CE, CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Groups C, D, E, F, G T4A, ATEX II 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC

- 1) Approximate shipping weight of transducer with standard cable length
- 2) When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

# Continuous level measurement - Ultrasonic transducers

# ST-H

Selection and Ordering data	Article No.		
EchoMax ST-H ultrasonic transducer	7ML1100-		
Level measurement in chemical storage and liquid tanks. The narrow design of the ST-H allows the transducer to be mounted on a 2 inch standpipe. Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).	<b>A O</b>		
Process connection  ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]  ETFE, R 2" [(BSPT), EN 10226]  ETFE, G 2" [(BSPP), EN ISO 228-1]  PVDF copolymer, 2" NPT [(Taper), ANSI/ASME	0 1 2		
B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]	4 5		
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	A B C		
50 m (164.04 ft) 100 m (328.08 ft)	D E		
Approvals CE, FM Class I, II, Div. 1, Groups C,D,E,F,G T4A ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T3 CE, ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC	2 3 4		
Operating Instructions	Article No.		
Quick Start Manual, multi-language	A5E32105880		
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61		
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.			

1)	Available with P	rocess	connection	options (	) 2 only
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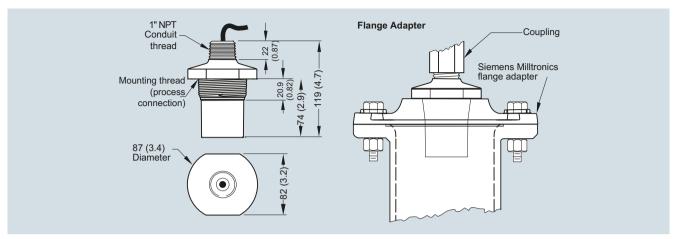
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17
Accessories	Article No.
Universal box bracket, mounting kit	7ML1830-1BK
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT	7ML1830-1BU
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 11/2" BSPT 304 stainless steel couplings	7ML1830-1GN

Available with Process connection options 3 ... 5 only
 Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres

## Continuous level measurement - Ultrasonic transducers

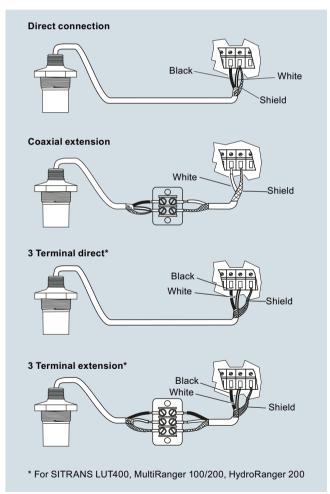
ST-H

# Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

# Schematics



ST-H ultrasonic transducer connections

Continuous level measurement - Ultrasonic transducers

#### **EchoMax XRS-5**

#### Overview



EchoMax XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

#### Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

#### Application

The XRS-5 is non-contacting with a measuring range from  $0.3\dots 8$  m (1  $\dots 26$  ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

Key Applications: wet wells, flumes, weirs, filter beds

### Technical specifications

trasonic transducer 3 8 m (1 26 ft), dependent on opplication
phoation
kHz
90
ompensated by integral mperature sensor
ormal atmospheric pressure
0 +65 °C (-4 +149 ° F)
2 kg (2.6 lb)
/DF copolymer enclosure and SM face
NPT [(Taper), NSI/ASME B1.20.1] or 1" [(BSPT), EN 10226]
65/IP68
core shielded/twisted, 0.5 mm <sup>2</sup> 0 AWG), PVC sheath
365 m (1 200 ft) with RG 62 A/U coaxial cable 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm <sup>2</sup> (20 AWG), PVC sheath, only for MultiRanger 100/200
ctory flange with PTFE face for SME, EN or JIS configuration
or applications with flooding ossible
E, RCM, KCC
SA Class I, Div. 2, Groups A,B,C,D, ass II, Div. 1 Groups E,F,G
A Class I, Zone 1, AEx m IIC, T6 ass II, III, Div. 1, Groups E,F,G T6
EX II 2GD / IECEx / INMETRO this mb IIC T6 Gb, Ex tb IIIC T85 °C
0 0 2 //6 N1 6 00 303 p(2) 0 0 5 0 8 1 6 8 1 8 1 8

# Continuous level measurement - Ultrasonic transducers

## EchoMax XRS-5

Selection and Ordering data		Art	icle	e N	Ю.		
EchoMax XRS-5 transducer		7M	L1	10	6-		Ī
With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds.  Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft).  Click on the Article No. for the online configura	t)	ľ		0	- 0		
tion in the PIA Life Cycle Portal.							
Process connection 1" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226]	•	1 2					
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	•	A B C					
Facing Standard (CSM rubber) PTFE (flange versions)	•		A B				
Approvals CE, RCM, KCC, CSA Class I, Div. 2, Groups A,B,C,D, Class II, Div. 1 Groups E,F,G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div 1, Groups E,F,G T6 ATEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85 °C Db	•		2	2			
Mounting flange (flush mount)							
None						A	
3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced						B C D	
DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced					ı	J K L	
JIS10K 3B style JIS10K 4B style JIS10K 6B style Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard	d.				ı	Q R S	
Operating Instructions		Art	icle	e N	Ю.		
Quick Start Manual, multi-language		<b>A5</b>	E3	229	9968	35	
Applications Guidelines, multi-language		7M	L1	99	8-5H	ł۷	1
Note: The Applications Guidelines should be ordered as a separate line item on the order.							
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.							

We can offer shorter delivery times for configurations designated with	the
Quick Ship Symbol   ■. For details see page 9/5 in the appendix.	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17
Accessories	Article No.
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 11/2" BSPT 304 stainless steel couplings	7ML1830-1GN
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSPT locknut, plastic	7ML1830-1DR

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Continuous level measurement - Ultrasonic transducers

## EchoMax XRS-5

Lonomax Ario 5				
Selection and Ordering data	Article No.			
EchoMax XRS-5C transducer	7ML1105-			
With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds.  Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft)	1 - 0			
Process connection 1" NPT [(Taper), ANSI/ASME B1.20.1]	1			
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)  ■	A B C			
Facing Standard (CSM rubber)  PTFE (flange versions)  ■	A B			
Approvals CSA Class I Div. 1, Groups A,B,C,D; Class II Div. 1,  Groups E,F,G; Class III	1			
Mounting flange (flush mount) None	A			
3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.	B C D			
Operating Instructions	Article No.			
Quick Start Manual, multi-language	A5E32299685			
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61			
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.				

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

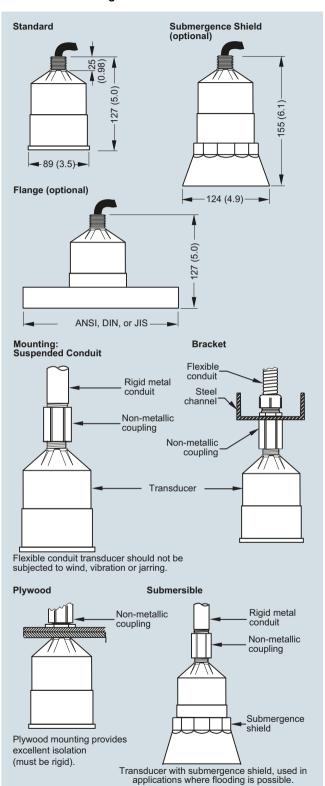
Selection and Ordering data	Order code
Further designs  Please add "-Z" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17
Accessories	Article No.
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
FMS-200 universal box bracket, mounting kit	7ML1830-1BK
FMS-210 channel bracket, wall mount	7ML1830-1BL
FMS-220 extended channel bracket, wall mount	7ML1830-1BM
FMS-310 channel bracket, floor mount	7ML1830-1BN
FMS-320 extended channel bracket, floor mount	7ML1830-1BP
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	7ML1830-1BQ

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Continuous level measurement - Ultrasonic transducers

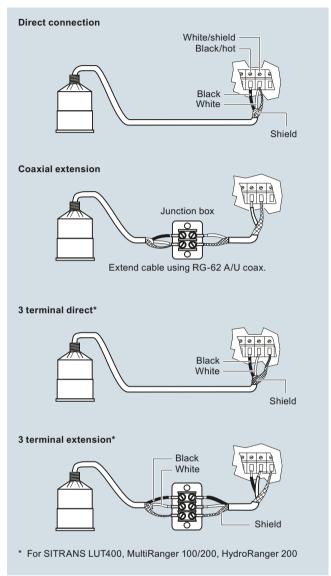
#### **EchoMax XRS-5**

# Dimensional drawings



XRS-5 ultrasonic transducer, dimensions in mm (inch)

# Schematics



XRS-5 ultrasonic transducer connections

Continuous level measurement - Ultrasonic transducers

#### **EchoMax XPS**

#### Overview



EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

## Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- · Hermetically sealed

## Application

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

# Continuous level measurement - Ultrasonic transducers

EchoMax XPS

# Technical specifications

Input	XPS-10	XPS-15 (standard and F models)	XPS-30		
Measuring range	0.3 10 m (1 33 ft)	Standard: 0.3 15 m (1 50 ft)  XPS-15F: 0.45 15 m (1.5 50 ft)	0.6 30 m (2 100 ft)		
Output					
Frequency	44 kHz	44 kHz	30 kHz		
Beam angle	12°	6°	6°		
Environmental					
Location	Indoors/outdoors				
Ambient temperature	-40 +95 °C (-40 +203 °F)	XPS-15F: -20 +95 °C (-4 +203 °F)	-40 +95 °C (-40 +203 °F)		
Pollution degree	4				
Pressure	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g) Flanged: 0.5 bar g (7.25 psi g)		
Design					
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb)  Flanged: 2 kg (4.4 lb)	4.3 kg (9.5 lb)		
Power supply	Operation of transducer only with	Operation of transducer only with approved Siemens Milltronics controllers			
Material	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange		
Color	Blue	Standard: Blue XPS-15F: Gray	Blue		
Process connection	1" NPT or 1" BSPT	Standard: 1" NPT or 1" BSPT  XPS-15F: 1" NPT	1.5" universal thread (NPT or BSPT)		
Degree of protection	IP66/68	IP66/68	IP66/68		
Cable	2 wire twisted pair/braided and foi	il shielded 0.5 mm² (20 AWG) PVC jacket			
Separation	Max. 365 m (1 200 ft)				
Certificates and approvals	Standard: CE, CSA, FM, ATEX, IECEX	Standard: CE, CSA, FM, ATEX, IECEX XPS-15F: FM Class I, Div. 1, Groups A, B, C and D, Class II Div. 1, Groups E, F and G, Class III	CE, CSA, FM, ATEX, IECEX		

<sup>1)</sup> EMC certificate available on request.

# Continuous level measurement - Ultrasonic transducers

# **EchoMax XPS**

EchoMax XPS-10 ultrasonic transducer  High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.  Measuring range: min. 0.3 m, max.10 m  Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Mounting thread and facing  1' NPT [(Taper), ANSI/ASME B1.20.1]  1' NPT [(Taper), ANSI/ASME B1.20.1]  2 with foam facing <sup>1</sup> 1' NPT [(Taper), ANSI/ASME B1.20.1]  with PTFE facing <sup>2</sup> )  1' NPT [(Taper), ANSI/ASME B1.20.1]  with PTFE facing <sup>2</sup> )  1' NPT [(Taper), ANSI/ASME B1.20.1]  with PTFE facing <sup>2</sup> )  1' NPT [(Taper), ANSI/ASME B1.20.1]  with PTFE facing <sup>2</sup> )  5 Cable length  5 m (16.40 ft)  10 m (32.81 ft)  5 m (16.40 ft)  10 m (32.81 ft)  50 m (164.04 ft)  100 m (328.08 ft)  Mounting flange  None  3' ASME, 150 lb, flat faced  4' ASME, 150 lb, flat faced  6' ASME, 150 lb, flat faced  6' ASME, 150 lb, flat faced  B A  3' ASME, 150 lb, flat faced  6' ASME, 150 lb, flat faced  DN 80, PN 10/16, Type A, flat faced  DN 150, PN 10/16, Type A, flat faced  B B  C C  C C  C C  C C  C C  C C  C	Selection and Ordering data	_	Ar	ticl	e No.	Т
for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.  Measuring range: min. 0.3 m, max.10 m  7 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Mounting thread and facing  1* NPT [(Taper), ANSI/ASME B1.20.1]  1* NPT [(Taper), ANSI/ASME B1.20.1]  1* NPT [(Taper), ANSI/ASME B1.20.1]  with foam facing 1*  1* NPT [(Taper), ANSI/ASME B1.20.1]  with PTFE facing 2*  R 1* [(BSPT), EN 10226] with foam facing 1*  R 1* [(BSPT), EN 10226] with PTFE facing 2*  Cable length  5 m (16.40 ft)  10 m (32.81 ft)  30 m (98.43 ft)  50 m (164.04 ft)  100 m (328.08 ft)  Mounting flange  None  3* ASME, 150 lb, flat faced  4* ASME, 150 lb, flat faced  6* ASME, 150 lb, flat faced  8* ASME, 150 lb, flat faced  8* ASME, 150 lb, flat faced  9 DN 100, PN 10/16, Type A, flat faced  DN 150, PN 10/16, Type A, flat faced  ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals  ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;  IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC  T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D;  Class II, Div. 1, Groups A,B,C,D, Class II,  CSA Class I, Div. 1, Groups A,B,C,D, Class II,  4	EchoMax XPS-10 ultrasonic transducer		7N	IL1	1115-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 2 with foam facing¹) 1" NPT [(Taper), ANSI/ASME B1.20.1] 2 with PTFE facing²)  R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing¹) 4 R 1" [(BSPT), EN 10226] with PTFE facing²)  Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)  50 m (164.04 ft) 100 m (328.08 ft)  Mounting flange None  A 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced B ASME, 150 lb, flat faced C ASME, 150 lb, flat faced DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150,	for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.				<b>0</b>	
1" NPT [(Taper), ANSI/ASME B1.20.1]  1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing 1)  1" NPT [(Taper), ANSI/ASME B1.20.1] with PTEF facing 2)  R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing 1) R 1" [(BSPT), EN 10226] with PTFE facing 2)  Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)  Mounting flange None  3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced BN 10, PN 10/16, Type A, flat faced DN 80, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JIS10K3B Style JIS10K3B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals  ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1, Groups A,B,C,D, Class II,	∠ Click on the Article No. for the online configura-					
R 1* [(BSPT), EN 10226] with foam facing 1) R 1* [(BSPT), EN 10226] with PTFE facing 2)  Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)  50 m (164.04 ft) 100 m (328.08 ft)  Mounting flange None  3* ASME, 150 lb, flat faced 4* ASME, 150 lb, flat faced 6* ASME, 150 lb, flat faced 8* ASME, 150 lb, flat faced Bhasher, 150 lb, f	1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing <sup>1)</sup> 1" NPT [(Taper), ANSI/ASME B1.20.1]	•	1			
5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)  50 m (164.04 ft) 100 m (328.08 ft)  Mounting flange None  3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced B" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced B" ASME,	R 1" [(BSPT), EN 10226] with foam facing 1)	•	4			
10 m (32.81 ft) 30 m (98.43 ft)  50 m (164.04 ft) 100 m (328.08 ft)  Mounting flange None  3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced BN 100, PN 10/16, Type A, flat faced DN 80, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced BN 150, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced BN 150, PN 10/16, PN 10	Cable length					
Mounting flange None  3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced BN 100, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced BN 150, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced BN 150, PN 10/16,	10 m (32.81 ft)	٠	(			
None  3* ASME, 150 lb, flat faced  4* ASME, 150 lb, flat faced  6* ASME, 150 lb, flat faced  8* ASME, 150 lb, flat faced  8* ASME, 150 lb, flat faced  BE  BE  BE  BE  BE  BE  BE  BE  BE  B	,		_			
3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced E 8" ASME, 150 lb, flat faced F DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JN 150, PN 10/16, Type A, flat faced JS10K3B Style JIS10K3B Style JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1, Groups A,B,C,D, Class II,	Mounting flange					
4* ASME, 150 lb, flat faced 6* ASME, 150 lb, flat faced 8* ASME, 150 lb, flat faced 8* ASME, 150 lb, flat faced F DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced L JIS10K3B Style JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;   IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1, Groups A,B,C,D, Class II,	None	٠		Α		
8° ASME, 150 lb, flat faced  DN 80, PN 10/16, Type A, flat faced  DN 100, PN 10/16, Type A, flat faced  DN 150, PN 10/16, Type A, flat faced  J DN 150, PN 10/16, Type A, flat faced  L JIS10K3B Style  JIS10K4B Style  JIS10K6B Style  (Note: Flange bolting patterns and facings dimensionally correspond to the applicable  ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals  ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC  T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D;  Class II, Div. 1, Groups E,F,G; Class III  CSA Class I, Div. 1, Groups A,B,C,D, Class II,				_		
DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced  J L  JIS10K3B Style JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals  ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;  IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III  CSA Class I, Div. 1, Groups A,B,C,D, Class II,	•					
JIS10K4B Style  JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)  Approvals  ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;  IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III  CSA Class I, Div. 1, Groups A,B,C,D, Class II,	DN 100, PN 10/16, Type A, flat faced			J		
ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;   IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC  T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D;  Class II, Div. 1, Groups E,F,G; Class III  CSA Class I, Div. 1, Groups A,B,C,D, Class II,	JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable	.)		P		
IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1, Groups A,B,C,D, Class II,	• •					
DIV. 1, Groups E.F.G. Class III "/	IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III	•				

1)	Not available	with	flanged	versions

<sup>2)</sup> Available with flanged versions only

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
Quick Start guide, multi-language	A5E32282889
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, aluminum, NPT with $\ensuremath{3\!/4}"\ x\ 1"$ PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSPT locknut, plastic	7ML1830-1DR

 $<sup>^{3)}\,</sup>$  Valid with mounting thread and facing options 0 ... 2 only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Continuous level measurement - Ultrasonic transducers

## **EchoMax XPS**

		_	_		
Selection and Ordering data		Ar	ticl	e No.	
EchoMax XPS-15 ultrasonic transducer		71	IL1	118-	
High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m				0	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.					
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1]		0			
1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing 1)	_	1			
1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing <sup>2)</sup>		2			
R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing <sup>1)</sup> R 1" [(BSPT), EN 10226] with PTFE facing <sup>2)</sup>	•	3 4 5			
Cable length					
5 m (16.40 ft)		_	3		
10 m (32.81 ft) 30 m (98.43 ft)	•		2		
*	_				
50 m (164.04 ft) 100 m (328.08 ft)			= (		
Mounting flange					
None	•		Α		
6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced			D E		
DN 150, PN 10/16, Type A, flat faced			J		
DN 200, PN 10, Type A, flat faced			K		
JIS10K 6B			N		
JIS10K 8B (Note: Flange bolting patterns and facings			Р		
dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard	d.)				
Approvals					
ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D;	•			3	
Class II, Div. 1, Groups E,F,G; Class III CSA Class I, Div. 1 Groups A,B,C,D, Class II, Div. 1, Groups E,F,G, Class III <sup>3)</sup>	•			4	
4\					

<sup>1)</sup> Not available with flanged versions

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	◆ Y15
Operating Instructions	Article No.
Quick Start guide, multi-language	A5E32282889
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, $12 \times 45$ mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BJ
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSPT locknut, plastic	7ML1830-1DR
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 11/2" BSPT 304 stainless steel couplings	7ML1830-1GN

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

<sup>2)</sup> Available with flanged versions only

<sup>3)</sup> Available with mounting options 0 ... 2 only

# Continuous level measurement - Ultrasonic transducers

EchoMax XPS				
Selection and Ordering data	Ar	tic	le	No.
EchoMax XPS-15F ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m		/IL		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.				
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1]	1			
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)		B C D E		
Mounting flange, flush mount None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)		A B C		
Approvals FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III			1	
Selection and Ordering data	Oı	de	er c	code
Further designs Please add "-Z" to Article No. and specify Order code(s).				
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	<b>Y</b> 1	5		
Operating Instructions	Ar	tic	le	No.
English	A	5E3	327	725813
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	71	ΛL	199	98-5HV61
This device is shipped with the Siemens Milltronics				

code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
English	A5E32725813
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BJ
Universal box bracket, mounting kit	7ML1830-1BK
Channel bracket, wall mount	7ML1830-1BL
Extended channel bracket, wall mount	7ML1830-1BM
Channel bracket, floor mount	7ML1830-1BN
Extended channel bracket, floor mount	7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU

Selection and Ordering data	Article No.
EchoMax XPS-30 ultrasonic transducer	7ML1123-
High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.  1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226]  Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	0
→ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Mounting thread and facing	
1½" universal thread	0
1½" universal thread, foam facing <sup>1)</sup> 1½" universal thread, PTFE facing <sup>2)</sup>	1 2
Cable length 5 m (16.40 ft)	В
10 m (32.81 ft)	C
30 m (98.43 ft)	E
50 m (164.04 ft)	F
100 m (328.08 ft)	K
Mounting flange None	
	A
6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced	D E
DN 150, PN 10/16, Type A, flat faced DN 200, PN 10, Type A, flat faced	J K
JIS10K 6B	N
JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	P
Approvals  ATEX 2G 1D Ex mb IIC T4 Gb, Ex ta IIIC T135 °C  Da; IECEx SIR 13.0009X Ex mb IIC T4 Gb,  Ex ta IIIC T135 °C Da	5
1) Net quallable with flanged versions	

- 1) Not available with flanged versions
- 2) Available with flanged versions only

2) Available with flanged versions only	
Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
Quick Start guide, multi-language	A5E32282889
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, $12 \times 45 \text{ mm}$ (0.47 x 1.77 inch), one text line for fastening on sensors	7ML1930-1BJ
1½" BSPT locknut, plastic	7ML1830-1DP
Easy Aimer 2, aluminum, NPT with 11/2" galvanized coupling	7ML1830-1AN
Easy Aimer 304, NPT with 11/2" stainless steel coupling	7ML1830-1AT
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 11/2" BSPT 304 stainless steel couplings	7ML1830-1GN

# Continuous level measurement - Ultrasonic transducers

# EchoMax XPS

Selection and Ordering data	Article No.
EchoMax XPS-30C ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.  1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	7ML1155-
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing <sup>1)</sup> 1½" universal thread, PTFE facing <sup>2)</sup>	0 1 2
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	B C E
50 m (164.04 ft) 100 m (328.08 ft)	F K
Mounting flange	
None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced	A D E
DN 150, PN 10/16, Type A, flat faced DN 200, PN 10, Type A, flat faced	J K
JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	N P
Approvals CSA, Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III	4

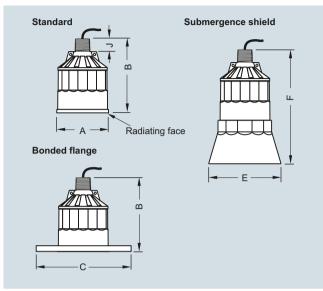
Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number / identification (max. 27 characters) specify in plain text	Y15
Operating Instructions	Article No.
Quick Start guide, multi-language	A5E32282889
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling	7ML1830-1AN
Easy Aimer 304, NPT with 11/2" stainless steel coupling	7ML1830-1AT
11/2" BSPT locknut, plastic	7ML1830-1DP

Not available with flanged versionAvailable for flanged versions only

Continuous level measurement - Ultrasonic transducers

#### **EchoMax XPS**

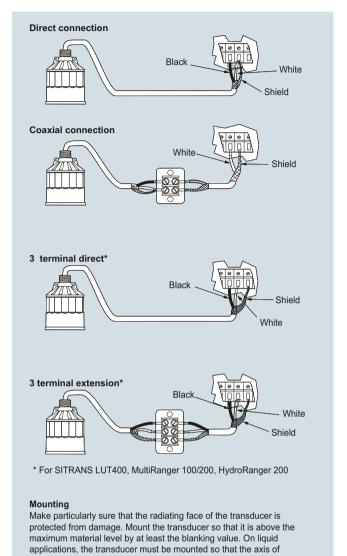
#### Dimensional drawings



XPS ultrasonic transducer, dimensions in mm (inch)

Version			
Dimension	XPS-10	XPS-15	XPS-30
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)
В	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)
С	According to AS	SME, DIN and JIS	
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

## Schematics



# the transducer. Interconnection

Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

transmission is perpendicular to the liquid surface. On solids applications, a Milltronics Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting

XPS ultrasonic transducer connections

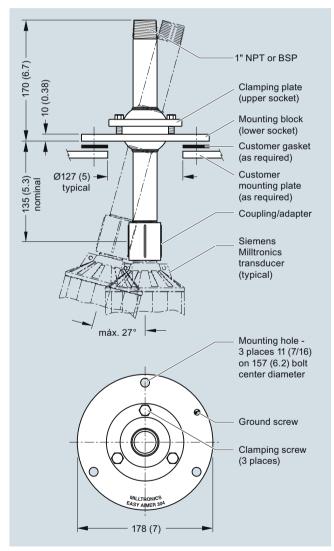
## Application

#### EA 304 aiming device

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens ultrasonic transducers used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments

#### Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

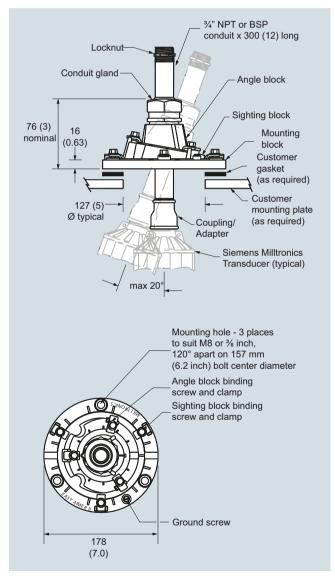
## Application

#### EA 2 aiming device

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens ultrasonic transducers.

The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

### Dimensional drawings



EA 2 aiming device, dimensions in mm (inch)

# Continuous level measurement - Accessories for ultrasonic

# EA aiming devices

Selection and Ordering data	Article No.
Easy aimer Used on solids applications to aim transducers for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.	
Easy Aimer 2, aluminum with M20 adapter and 1" and 11/2" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Easy Aimer 2, aluminum, BSPT conduit	7ML1830-1AL
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling 1)	7ML1830-1AN
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	7ML1830-1AP
Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, BSPT conduit	7ML1830-1AS
Easy Aimer 304, NPT with 1½" stainless steel coupling 1)	7ML1830-1AT
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Operating Instructions	
Easy Aimer 2 and 304 Operating Instructions, Multi-language	7ML1998-5HG62
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the Quick Start and Operating Instructions library.	

<sup>1)</sup> For use with XPS-30 transducers only

Continuous level measurement - Accessories for ultrasonic

#### FMS mounting brackets

## Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

#### FMS-200 universal box bracket system

Mounting of units with 1 inch or 2 inch threaded connection.

Distance from sensor to wall or beam: 20 ... 31 cm (8 ... 12 inch).

The unique box design also acts as a sun shield for transducers with 1 inch threaded connections.

# FMS-210 wall mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 12 ... 48 cm (5 ... 19 inch).

# FMS-220 extended wall mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 32 ... 98 cm (13 ... 39 inch).

# FMS-310 floor mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 5 ... 57 cm (2 ... 22 inch).

# FMS-320 extended floor mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 41 ... 108 cm (16 ... 43 inch).

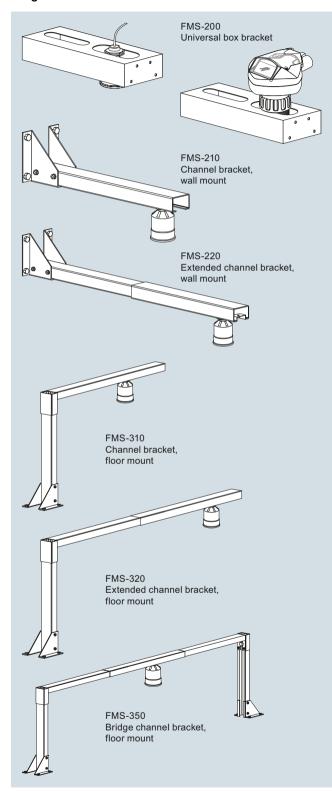
# FMS-350 floor mounting set, bridge

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch), anywhere along the complete width of the bridge [166 cm (65 inch)].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

## Integration



FMS mounting brackets

Continuous level measurement - Accessories for ultrasonic

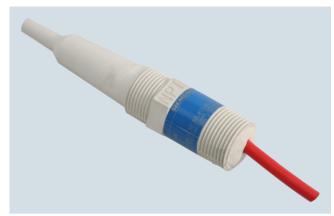
# FMS mounting brackets

Selection and Ordering data	Article No.
Mounting brackets for XPS-10 sensors	
FMS-200 universal box bracket set	7ML1830-1BK
FMS-210 wall mounting set	7ML1830-1BL
FMS-220 extended wall mounting set	7ML1830-1BM
FMS-310 floor mounting set	7ML1830-1BN
FMS-320 extended floor mounting set	7ML1830-1BP
FMS-350 floor mounting set, bridge	7ML1830-1BQ
Additional Operating Instructions	
FMS-200	7ML1998-5BK61
FMS-210	7ML1998-5BL61
FMS-220	7ML1998-5BM61
FMS-310	7ML1998-5BN61
FMS-320	7ML1998-5BP61
FMS-350	7ML1998-5BQ61
Note: The Operating Instructions should be ordered as a separate line item on the order.	

#### Continuous level measurement - Accessories for ultrasonic

#### TS-3 temperature sensor

#### Overview



The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

#### Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

#### Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

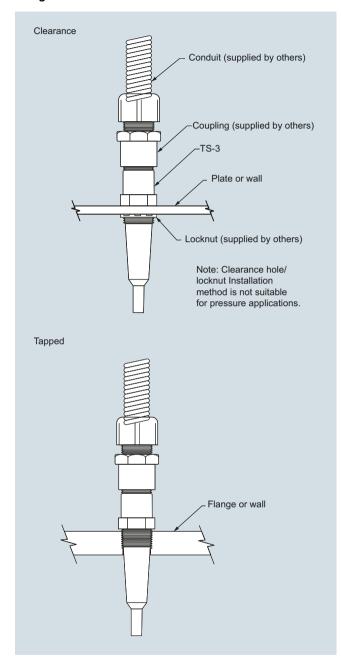
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

 Key Applications: For use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

## Design



TS-3 temperature sensor

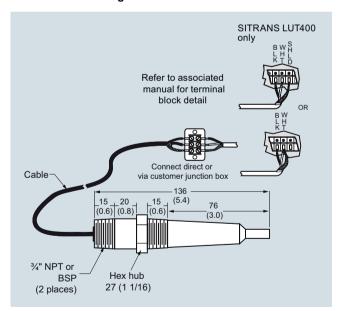
# Continuous level measurement - Accessories for ultrasonic

#### TS-3 temperature sensor

Technical specifications	
Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 +100 °C (-40 +212 °F)
Output	
Response time	
<ul> <li>Forced circulation (temperature variation: 63 %)</li> </ul>	55 s
<ul> <li>Flange, forced circulation</li> </ul>	90 s
<ul> <li>Natural convection</li> </ul>	150 s
Rated operating conditions	
Installation instructions	Mounted indoors/outdoors, but not exposed to direct sunlight
Pressure	Max. 4 bar (60 psi/400 kPa)
Design	
Material (enclosure)	ETFE <sup>1)</sup>
Cable connection	2-core, 0.5 $\rm mm^2$ (20 AWG), shielded, silicone sheath
Process connection	<sup>3</sup> / <sub>4</sub> " NPT [(Taper), ANSI/ASME B1.20.1]
	R ¾" [(BSPT), EN 10226], totally encapsulated
Certificates and approvals	CE, IEC Ex, FM, CSA, ATEX

<sup>1)</sup> ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

#### Dimensional drawings



TS-3 temperature sensor, dimensions in mm (inch)

Selection and Ordering data	Article No.
TS-3 temperature sensor	7ML1813-
TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.	В
Compensation is essential in applications where variation in temperature of the sound medium is expected.	
Cable length	
1 m (3.28 ft)	1
5 m (16.40 ft)	2
10 m (32.81 ft)	3
30 m (98.43 ft)	4
50 m (164.04 ft)	5
70 m (229.66 ft)	6
90 m (295.28 ft)	7
Process connection  3/4" NPT [(Taper), ANSI/ASME B1.20.1]  R 3/4" [(BSPT), EN 10226]	A B
Approvals	
CSA, FM CE, ATEX, IEC Ex	3 4
Operating Instructions	7
English	A5E32337739
German	A5E34990011
Note: The Operating Instructions should be ordered as a separate line item on the order.	A3E34330011
This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.	
Accessories	
3/4" NPT locknut, aluminum	7ML1930-1BE
Tag, stainless steel with hole, $12 \times 45$ mm (0.47 x 1.77 inch) for fastening on sensors	7ML1930-1BJ

Radar transmitters

## Continuous level measurement - Radar transmitters

#### Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR260 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids in silos to a range of 30 m (98.4 ft). Ideal for applications with extreme dust and high temperatures to 200 °C (392 °F) and liquids in vessels.

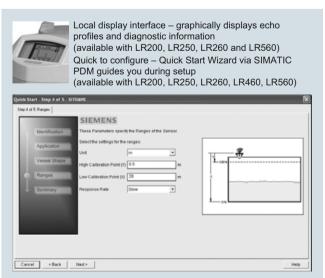
SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

#### Auto False-Echo Suppression

SITRANS LR instruments offer the unique advantage of Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART or PROFIBUS PA.



## Mode of operation

#### Principle of Operation

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

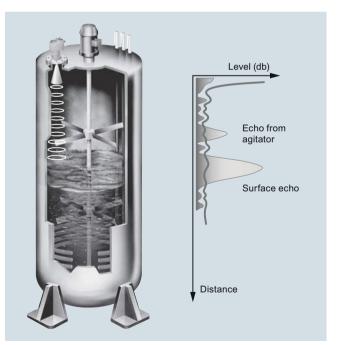
Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 26 GHz.

Siemens offers pulse radar transmitters (SITRANS Probe LR, SITRANS LR200, SITRANS LR250, SITRANS LR260) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR460, SITRANS LR560).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored). The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.



Radar operation in a reactor vessel

Continuous level measurement - Radar transmitters

# Radar transmitters

# Technical specifications

# Radar Selection Guide

Criteria	SITRANS Probe LR	SITRANS LR200	SITRANS LR250	SITRANS LR260	SITRANS LR460	SITRANS LR560
Typical industries	Chemicals, petro- chemicals, water/ waste-water, drilling mud	Chemicals, petro- chemicals, aluminum, wastewater	Chemicals, petro- chemicals, and oil and gas, mining, marine, food and beverage, and phar- maceutical	Cement, power generation, petrochemical, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining
Typical applications	Liquids, storage ves- sels, wet wells, and drilling mud tanks	Liquids, process ves- sels with agitators, build-up, and high temperatures	Liquids, storage and process vessels with agitators, vaporous liquids, high temper- atures, low dielectric media, and crude oil produced water	Cement, plastics, grain, flour, coal, liquids < 20 m, and low dielectric liquids < 30 m	Cement, fly ash, grain, coal, flour, plastics	Cement, fly ash, grain, coal, flour, plastics
Range	0.3 20 m (1 65 ft)	0.4 20 m (1.3 65 ft)	50 mm (2 inch) from end of horn to 20 m (65 ft), horn depen- dent	30 m (98.4 ft)	100 m (328 ft)	40 m (131 ft) 100 m (328 ft)
Frequency	5.8 GHz (North America 6.3 GHz)	5.8 GHz (North America 6.3 GHz)	K-band (25.0 GHz)	K-band (25.0 GHz)	24 25 GHz FMCW	78 79 GHz
Performance accuracy	0.1 % of range or 10 mm (0.4 inch)	0.1 % of range or 10 mm (0.4 inch)	≤ 3 mm (0.118 inch)	25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) Remainder of range = 10 mm (0.39 inch) or 0.1 % of span (whichever is greater)	0.25 %	0.25 %
Temperature	Ambient: -40 +80 °C (-40 +176 °F) Process: -40 +80 °C (-40 +176 °F	Ambient: -40 +80 °C (-40 +176 °F) Process: -40 +200 °C (-40 +392 °F), dependent on antenna type	Ambient: -40 +80 °C (-40 +176 °F) Process: -40 +200 °C (-40 +392 °F) dependent on antenna type	Ambient: -40 +80 °C (-40 +176 °F) Process: -40 +200 °C (-40 +392 °F) dependent on antenna type	Ambient: 65 °C (149 °F) Process: 200 °C (392 °F)	Ambient: -40 +80 °C (-40 +176 °F) Process: -40 +100 °C (-40 212 °F) Optional: 200 °C (392 °F)
Output/communications/remote configuration and diagnostics		4 20 mA/HART     PROFIBUS PA     SIMATIC PDM     AMS     SITRANS DTM/FDT for PACTware, Fieldcare, etc.	4 20 mA/HART     PROFIBUS PA     FOUNDATION     Fieldbus     SIMATIC PDM     AMS     SITRANS DTM/FDT     for PACTware,     Fieldcare, etc.	• 4 20 mA/HART • PROFIBUS PA • SIMATIC PDM	• 4 20 mA/HART • PROFIBUS PA • SIMATIC PDM	4 20 mA/HART     PROFIBUS PA     FOUNDATION     Fieldbus     SIMATIC PDM     AMS     SITRANS DTM/FDT     for PACTware,     Fieldcare, etc.
Power	24 V DC nominal     Loop powered	24 V DC nominal     Loop powered	24 V DC nominal     Loop powered	24 V DC nominal     Loop powered	• 100 230 V AC, ±15 %, 50/60 Hz, 6 W • 24 V DC, +25/-20 %, 6 W	24 V DC nominal     Loop powered
Approvals	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, ANZEx, TIIS	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEX, ANZEX, TIIS, NEPSI	CE, RCM, Lloyds Register of Shipping, ABS, BV, FCC, Indus- try Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEX, TIIS, NEPSI Functional safety SIL 2, EHEDG, 3-A, USP Class VI	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST, IECEX	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEX, GOST	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEX, NEPSI, GOST

Continuous level measurement - Radar transmitters

Radar transmitters

# Application

# **SIEMENS**

Radar Application	Questionnaire	
Customer information		
Contact:		Prepared By:
Company:		
Address:		Notes on the Application:
Dity:	Country:	
Zip/Postal Code:	Phone: ()	
E-mail:	Fax: <u>( )</u>	
Storage Solids	Storage Liquids	☐ Sketch attached ☐ Process ☐ Reactor
area safety classificat		
	m/ft Diameter:	m/ft Filling method:
Гор: ─┐	Atmosphere: (indicate all that apply)	Pressure:
⊒ Flat ¬	☐ Foam ☐ Steam	Normal:
⊒ Parabolic	☐ Dust ☐ Deposit (build-	up) Maximum (relief):
_ Conical	☐ Vapor	
lounting connection		Critical Information
istance to sidewall: _		cm/inch Nozzle Length: cm/inch
lounting connection i	naximum temperature:	°C/°F Nozzle Diameter: cm/inch
lax. temperature at el	ectronics:	°C/°F
Stilling well or Still Pip	pe mounting: Yes No	Stilling well diameter:cm/inch
Material		
Material being measu	red:	Liquid Solid Liquified gas
Material temperature:	Norm: °C/°F Max:	°C/°F
Material surface:	Flat	$\square$ Vortex Dielectric constant: $\square$ $E_r < 3$ $\square$ $E_r > 3$
Installation		Communications:
Power available:		☐ HART/4 20 mA
		☐ PROFIBUS PA
		☐ FOUNDATION Fieldbus ☐ None
Products recommende	.q.	
- Todaolo Todominienae	struments Inc. www.siemer	is.com/processautomation Update 03/201

Continuous level measurement - Radar transmitters

#### SITRANS Probe LR

#### Overview



SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

#### Benefits

- Uni-Construction polypropylene rod antenna standard
- Easy installation and simple start up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART handheld communicator
- · Communication using HART
- Process Intelligence signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression of false echoes

## Application

The Probe LR is ideal for applications with chemical vapors, temperature gradients, vacuum or pressure, such as simple chemical storage or water treatment vessels. SITRANS Probe LR has a range of 0.3 to 20 m (1 to 65 ft).

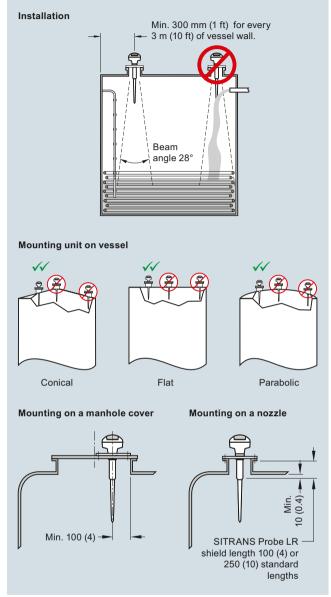
Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

SITRANS Probe LR incorporates Process Intelligence signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

Start-up is easy with as few as two parameters for basic operation. Programming is simple using SIMATIC PDM, HART handheld communicator or the Intrinsically Safe handheld programmer.

 Key Applications: chemical storage, wastewater wet well, and drilling mud

## Configuration



SITRANS Probe LR installation, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# SITRANS Probe LR

# Technical specifications

Mode of operation	
Measuring principle	Pulse radar level measurement
Frequency	5.8 GHz (North America 6.3 GHz)
Measuring range	0.3 20 m (1.0 65 ft)
Output	
Analog output	4 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART
Performance (reference conditions)	
Accuracy	± the greater of 0.1 % of range or 10 mm (0.4 inch)
Influence of ambient temperature	0.003 %/K
Repeatability	± 5 mm (2 inch)
Fail-safe	mA signal programmable as high, low or hold (LOE)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)  • Ambient temperature	-40 +80 °C (-40 +176 °F)
Installation category	
Pollution degree	4
Medium conditions	
Dielectric constant $\boldsymbol{\epsilon}_{r}$	$\epsilon_{r} >$ 1.6 (for $\epsilon_{r} <$ 3, use stillpipe)
Vessel temperature	-40 +80 °C (-40 +176 °F)
Vessel pressure	3 bar g (43.5 psi g)
Design	
Enclosure	
Body construction     Lid construction	PBT (Polybutylene Terephthalate)
Cable inlet	PEI (Polyether Imide) 2 x M20x1.5 or
	2 x ½" NPT with adapter
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	1.97 kg (4.35 lb)
Antenna	
Material	Polypropylene rod, hermetically sealed construction
Dimensions	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle or optional 250 mm (10 inch) long shield
Process connections	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1]

Power supply	• Nominal 24 V DC with max. 550 $\Omega$ , maximum 30 V DC • 4 20 mA
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM, RCM
Marine	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li></ul>
Radio	FCC, Industry Canada and European (R&TTE), RCM
Hazardous	
<ul> <li>Intrinsically Safe (Brazil)</li> </ul>	INMETRO Ex ia IIC T4 Ga
<ul> <li>Intrinsically Safe (Canada)</li> </ul>	CSA Class I, Div.1, Groups A,B,C,D;
Intrinsically Safe (Europe)	Class II, Div. 1, Group G; Class III ATEX II 1G FEx ia IIC T4
Intrinsically Safe (Europe)     Intrinsically Safe (International)	IECEX Ex ia IIC T4
Intrinsically Safe (Russia)	GOST-R Ex ia
Intrinsically Safe (USA)	FM Class I, Div.1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III
Programming	
Handheld programmer	HART communicator 375
PC	SIMATIC PDM
Intrinsically safe Siemens handheld programmer (optional)	Infrared receiver
Approvals (handheld programmer)	ATEX II 1G EEx ia IIC T4 CSA and FM Class I, Div.1, Groups A,B,C,D, T6 at max. ambient
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

## Continuous level measurement - Radar transmitters

## SITRANS Probe LR

Selection and Ordering data		Article	e No.
SITRANS Probe LR		7ML5	430-
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).		-	0
Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)			
✓ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.			
Enclosure/Cable inlet Plastic, (PBT), 2 x ½" NPT Plastic, (PBT), 2 x M20x1.5	•	1 2	
Antenna type/Material - (max. 3 bar and 80 °C)			
Polyproylene Antenna 1½" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 100 mm shield	•	A	
R 1½" [(BSPT), EN 10226], comes with integral 100 mm shield	•	В	
G 1½" [(BSPP), EN ISO 228-1], comes with integral 100 mm shield	•	С	
1½" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 250 mm shield	•	D	
R 1½" [(BSPT), ĔN 10226],	•	E	
comes with integral 250 mm shield G 1½" [(BSPP), EN ISO 228-1], comes with integral 250 mm shield	•	F	
Approvals General Purpose, CE, R&TTE, RCM General Purpose, CSA <sub>us/c</sub> , FM, FCC CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, FCC, Intrinsically Safe	• • •	A B C	
FM, Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe IECEX Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, R&TTE, RCM, Intrinsically Safe; INMETRO Ex ia IIC T4 Ga; GOST-R	•	D E	
Communication/Output 4 20 mA, HART	•		1

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

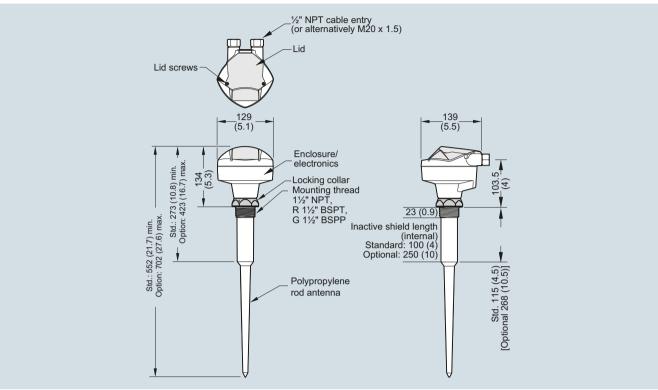
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:   Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Operating Instructions	Article No.
English	A5E32337711
French	7ML1998-5HR11
Spanish	7ML1998-5HR21
German Note: The Operating Instructions should be ordered as a separate item on the order.	A5E34957879
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Additional Operating Instructions	
Multi-language Quick Start manual	A5E32106153
Accessories	
Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex ia	7ML5830-2AH
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F)	7ML1930-1AP
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	
Spare parts	
Plastic lid	7ML1830-1KB
For applicable back up point level switch - see point level measurement section	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Continuous level measurement - Radar transmitters

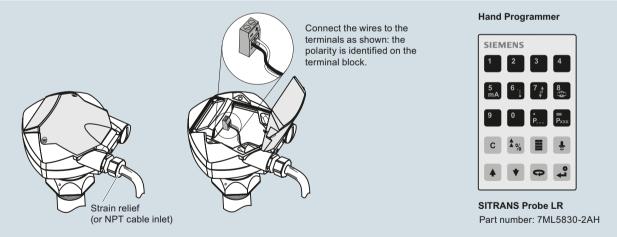
# SITRANS Probe LR

# Dimensional drawings



SITRANS Probe LR, dimensions in mm (inch)

#### Schematics



#### Notes:

- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Use shielded twisted pair cable (14-22 AWG)
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LR connections

Continuous level measurement - Radar transmitters

#### **SITRANS LR200**

#### Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

#### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

#### Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alphanumeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference

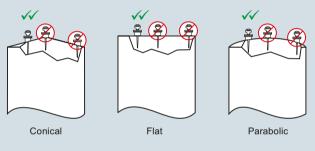
Start-up is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features Process Intelligence signal-processing technology for superior reliability.

 Key Applications: liquid process vessels with agitators, vaporous liquids, high temperatures, asphalt, digesters

## Configuration

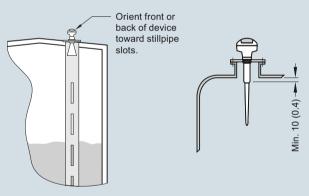
#### Installation Min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall. Note: Beam angle is the width of the cone where the energy density is half of the peak energy density. Beam angle for horn antenna dependent on horn size The peak energy density is directly in front of and in line Beam with the rod antenna. angle 28° There is a signal transmitted outside of the beam angle; therefore false targets may be detected

#### Mounting unit on vessel



#### Mounting unit on stilling well

### Mounting on a nozzle



SITRANS LR200 installation, dimensions in mm (inch)

Power supply

# **Level Measurement**

# Continuous level measurement - Radar transmitters

# SITRANS LR200

# Technical specifications

Technical specifications	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	5.8 GHz (North America 6.3 GHz)
Measuring range	0.3 20 m (1.0 65 ft)
Output	, ,
Analog output	4 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART
	Optional: PROFIBUS PA (Profile 3.0, Class B)
Fail-safe	Programmable as high, low or hold (Loss of Echo)
Performance (according to reference conditions IEC60770-1)	
From end of antenna to 600 mm:	40 mm (1.57 inch)
Remainder of range:	10 mm (0.4 inch) or 0.1 % of span (whichever is greater)
Rated operating conditions	
Installation conditions • Location	Indoor/outdoor
Ambient conditions (enclosure)  • Ambient temperature  • Installation category	-40 +80 °C (-40 +176 °F)
Pollution degree	4
Medium conditions	10 (for 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Dielectric constant ε <sub>r</sub>	$\varepsilon_r > 1.6$ (for $\varepsilon_r < 3$ , use stillpipe)
Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information
Design	
Enclosure	
<ul><li>Material</li><li>Cable inlet</li></ul>	Aluminum, polyester powder coated 2 x M20x1.5 or 2 x ½" NPT with adapter
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Weight	< 2.82 kg (6.21 lb) (polypropylene rod antenna)
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Antenna	
Material	Polypropylene rod, hermetically sealed construction, optional PTFE
• Dimensions	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or
Optional rods and horn	optional 250 mm (10 inch) long shield Refer to SITRANS LR200 Antennas for optional rods and horns
Process connections	
Process connection	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226], or G 1½" [(BSPP), EN ISO 228-1] (polypropylene rod antenna)
Flange connection	Refer to SITRANS LR200 Antennas for more connections

Power supply	
4 20 mA/HART	
<ul> <li>General Purpose, Non-incendive, Intrinsically Safe</li> </ul>	Nominal 24 V DC (max. 30 V DC) with max. 550 $\Omega$
Flame proof, Increased safety,	Nominal 24 V DC (max. 30 V DC) with
Explosion proof	max. 250 $\Omega$
PROFIBUS PA	• 10.5 mA • Per IEC 61158-2
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM, RCM
Marine	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li></ul>
Radio	FCC, Industry Canada and European (R&TTE), RCM
Hazardous	
Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
Explosion Proof (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
Intrinsically Safe (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
• Non-incendive (USA)	FM, Class I, Div. 2, Groups A, B, C, D, T5
Flame Proof/Increased Safety (China)	NEPSI Ex d mb ia IIC T4/ Ex e mb ia IIC T4
• Flame Proof (Europe)	ATEX II 1/2 G Ex d mb ia IIC T4
• Increased Safety (Europe)	Ga/Gb ATEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb
<ul> <li>Intrinsically Safe (Europe)</li> </ul>	ATEX II 1G Ex ia IIC T4
Intrinsically Safe (International)     Intrinsically Safe (Pyrasia)	IECEX Ex ia IIC T4
Intrinsically Safe (Russia)	GOST-R Ex ia
Programming	Information of the control of the co
Intrinsically Safe Siemens handheld programmer	Infrared receiver
Approvals for handheld programmer	IS model:
	ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C $T_a$ = -20 +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 $T_a$ = +50 °C
Handheld communicator	HART communicator 375
PC	• SIMATIC PDM • AMS
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

# Continuous level measurement - Radar transmitters

Selection and Ordering data	Article	No.
SITRANS LR200, Uni-Construction polypropylene rod antenna version	7ML54	122-
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).		
Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Enclosure/Cable inlet Aluminum, epoxy painted		
2 x ½" NPT 2 x M20x1.5	2 3	
Polypropylene antenna type -		
(Max. 3 Bar pressure and 80 °C) 1½" NPT [(Taper), ANSI/ASME B1.20.1],	Α	
c/w integral 100 mm shield R 1½" [(BSPT), EN 10226],	В	
c/w integral 100 mm shield G 1½" [(BSPP), EN ISO 228-1],	С	
c/w integral 100 mm shield		
1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield	D	
R 1½" [(BSPT), EN 10226], c/w integral 250 mm shield	E	
G 1½" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield	F	
Approvals		
General Purpose, CE, R&TTE, RCM General Purpose, CSA, FM, Industry Canada, FCC	A B	
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	С	
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC	D	
Intrinsically Safe, IECEX/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R	E	
Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC <sup>1)</sup>	F	
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R <sup>2)3)</sup>	G	
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/ Gb, CE, R&TTE, RCM; GOST-R <sup>3)</sup>	Н	
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC <sup>1)3)</sup>	J	
Communication/Output		
PROFIBUS PA 4 20 mA, HART, start-up at < 3.6 mA	3	

<sup>&</sup>lt;sup>2)</sup> Available with enclosure option 3 only

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Namur NE43 compliant, device preset to failsafe $< 3.6 \text{ mA}^{1)}$	N07
Operating Instructions for HART/mA device	Article No.
English	A5E32337676
German	A5E34942758
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E31993614
Operating Instructions for PROFIBUS PA device	
English	A5E32337680
German	A5E34942820
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32153438
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART <sup>2)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA <sup>2)</sup>	7ML1930-1AQ
One general purpose polymeric cable gland M20x1.5, rated -20 + 80 °C (-40 +176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

<sup>1)</sup> Available with communication option 3 only

<sup>3)</sup> Available with communication option 3 only

Product shipped with plastic cable gland, rated to -20 °C.
 If -40 °C rating required, then metallic cable gland is recommended.

## Continuous level measurement - Radar transmitters

Selection and Ordering data	Article	No.
SITRANS LR200, Flange Adapter/PTFE Rod	7ML54	23-
Antenna Version  2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).		
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Antenna material (uses antenna adapter) PTFE, uses antenna adapter and additional process connection below	1	
Process connection (refer to Pressure/ Temperature curves, page 4/208)		
Flanges (316L stainless steel) DN 50 PN 16, Type A, flat faced DN 80 PN 16, Type A, flat faced DN 100 PN 16, Type A, flat faced DN 150 PN 16, Type A, flat faced	A A B A C A D A	
2" ASME 150 lb, flat faced 3" ASME 150 lb, flat faced 4" ASME 150 lb, flat faced 6" ASME 150 lb, flat faced	FB GB HB JB	
DN 50 PN 40, flat faced DN 80 PN 40, flat faced DN 100 PN 40, flat faced DN 150 PN 40, flat faced	A C B C C C D C	
2" ASME 300 lb, flat faced, available with Pressure rating option 1 only due to flange hole spacing 3" ASME 300 lb, flat faced 4" ASME 300 lb, flat faced	F D G D H D	
6" ASME 300 lb, flat faced	J D	
JIS DN 50 10K JIS DN 80 10K JIS DN 100 10K JIS DN 150 10K JIS DN 150 10K (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	AE BE CE DE	
Threaded connection (316L stainless steel) 1½" NPT [(Taper), ANSI/ASME B1.20.1] 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226]	L A M A L C	
R 2" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1] G 2" [(BSPP), EN ISO 228-1]	M C L E M E	
Antenna extensions or Inactive shield length No antenna extension	0	
50 mm (2 inch) extension, PTFE 100 mm (4 inch) extension, PTFE	1 2	
100 mm (4 inch) extension, 316L stainless steel shield <sup>1)</sup> 150 mm (6 inch) extension, 316L stainless steel shield <sup>1)</sup>	3 4	
200 mm (8 inch) extension, 316L stainless steel shield <sup>1</sup> )	5	
250 mm (10 inch) extension, 316L stainless steel shield <sup>1)</sup>	6	
Process seal/gasket Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 6 FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2		0

Selection and Ordering data	Article No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version  2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	7ML5423-
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT 2 x M20x1.5	2 3
Communication/Output PROFIBUS PA 4 20 mA, HART, start-up at < 3.6 mA	B C
Approvals General Purpose, CE, R&TTE, RCM General Purpose, CSA, FM, Industry Canada, FCC Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	A B C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC Intrinsically Safe, IECEX/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC <sup>2)</sup>	D E F
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R <sup>3)4)</sup> Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R <sup>4)</sup> Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC <sup>2)4)</sup>	G H J
Pressure rating Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	0

- $^{1)}$  Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only
- $^{2)}$  Available with enclosure option 2 only
- 3) Available with enclosure option 3 only
- 4) Available with communication option C only

# Continuous level measurement - Radar transmitters

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe $< 3.6 \text{ mA}^{3)}$	N07
Operating Instructions for HART/mA device	Article No.
English	A5E32337676
German	A5E34942758
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E31993614
Operating Instructions for PROFIBUS PA device	
English	A5E32337680
German	A5E34942820
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32153438
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
Antenna, rod, PTFE	7ML1830-1HC
Antenna extension, 50 mm (2 inch), PTFE	7ML1830-1CH
Antenna extension, 100 mm (4 inch), PTFE	7ML1830-1CG
HART modem / USB (for use with PC and SIMATIC PDM)	7MF4997-1DB
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) 80 °C (176 °F), HART (two are required)	7ML1930-1AP
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) 80 °C (176 °F), PROFIBUS PA (two required)	7ML1930-1AQ
One General Purpose polymeric cable gland M20 x 1.5, rating for -20 °C (-4°F)+ 80 °C (176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

# Continuous level measurement - Radar transmitters

Selection and Ordering data	Article No.	
SITRANS LR200,	7ML5425-	
Flange adapter/Horn Antenna version		
2-wire, 6 GHz pulse radar level transmitter for		
continuous monitoring of liquids and slurries in process vessels including high temperature and		
pressure, to a range of 20 m (66 ft).		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
Antenna material (uses antenna adapter)		
316L stainless steel with PTFE cone emitter 316L stainless steel with PTFE cone emitter and	0	
purge connection with 1/8" NPT inlet <sup>1)</sup>		
Sliding waveguide system with 1 000 mm (40 inch)	2	
waveguide <sup>1)Ž)</sup>		
Process connection (refer to Pressure/ Temperature curves, page 4/209)		
Flanges (316L stainless steel)		
DN 50 PN 16 EN 1092-1 Type A flat faced <sup>1)</sup>	AA	
DN 80 PN 16 EN 1092-1 Type A flat faced DN 100 PN 16 EN 1092-1 Type A flat faced	B A C A	
DN 150 PN 16 EN 1092-1 Type A flat faced	DA	
DN 200 PN 16 EN 1092-1 Type A flat faced	E A	
DN 80 PN 10/16 DIN EN 1092-1 Type B1 raised face <sup>3)</sup>	B F C F	
DN 100 PN 10/16 DIN EN 1092-1 Type B1 raised face <sup>3)</sup> DN 150 PN 10/16 DIN EN 1092-1 Type B1 raised face <sup>3)</sup>	DF	
DN 200 PN 16 DIN EN 1092-1 Type B1 raised face <sup>3)</sup>	E F	
2" ASME 150 lb, flat faced <sup>1)</sup>	F B	
3" ASME 150 lb, flat faced 4" ASME 150 lb, flat faced	G B H B	
6" ASME 150 lb, flat faced	J B	
8" ASME 150 lb, flat faced	КВ	
DN 50 PN 40, flat faced <sup>3)</sup>	AC	
DN 80 PN 40, flat faced <sup>3)</sup> DN 100 PN 40, flat faced <sup>3)</sup>	B C C C	
DN 200 PN 40, flat faced <sup>3)</sup>	E C	
DN 80 PN 25/40 DIN EN 1092-1 Type B1 raised face <sup>3)</sup>	CG	
DN 100 PN 25/40 DIN EN 1092-1 Type B1 raised face <sup>3)</sup>	DG	
DN 150 PN 25/40 DIN EN 1092-1 Type B1 raised	EG	
face <sup>3)</sup>		
2" ASME 300 lb, flat faced <sup>1)3)</sup>	F D G D	
3" ASME 300 lb, flat faced <sup>3)</sup> 4" ASME 300 lb, flat faced <sup>3)</sup>	HD	
JIS DN 50 10K <sup>1)</sup>	ΑE	
JIS DN 80 10K	BE	
JIS DN 100 10K JIS DN 150 10K	C E D E	
JIS DN 200 10K	EE	
(Note: Flange bolting patterns and facings		
dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	)	
Communication/Output		
PROFIBUS PA	1 2	
4 20 mA, HART, start-up at < 3.6 mA	2	

Selection and Ordering data	Article No.	
SITRANS LR200,	7ML5425-	
Flange adapter/Horn Antenna version		
2-wire, 6 GHz pulse radar level transmitter for		
continuous monitoring of liquids and slurries in		
process vessels including high temperature and		
pressure, to a range of 20 m (66 ft).		
Process seal/gasket		
FKM (-40 +200 °C)	0	
Nitrile (-40 +60 °C),	1	
sliding waveguide systems only		
FFKM (-35 +200 °C)	2	
Enclosure/Cable inlet		
Aluminum, Epoxy painted		
2 x ½" NPT	2	
2 x M20x1.5	3	
Horn size/Waveguide options	_	
80 mm (3 inch) horn <sup>4)</sup>	В	
100 mm (4 inch) horn <sup>4)</sup>	C	
150 mm (6 inch) horn	D	
200 mm (8 inch) horn	E	
100 mm (4 inch) horn with 100 mm (4 inch)	F	
waveguide extension <sup>4)</sup>		
100 mm (4 inch) horn with 150 mm (6 inch)	G	
waveguide extension <sup>4)</sup>	.,	
100 mm (4 inch) horn with 200 mm (8 inch) wave-guide extension <sup>4)</sup>	н	
-		
100 mm (4 inch) horn with 250 mm (10 inch)	J	
waveguide extension <sup>4)</sup>		
150 mm (6 inch) horn with 100 mm (4 inch)	K	
waveguide extension		
150 mm (6 inch) horn with 150 mm (6 inch) waveguide extension	L	
150 mm (6 inch) horn with 200 mm (8 inch)	м	
wavequide extension	IVI	
150 mm (6 inch) horn with 250 mm (10 inch)	N	
wavequide extension	N	
200 mm (8 inch) horn with 100 mm (4 inch)	P	
waveguide extension		
200 mm (8 inch) horn with 150 mm (6 inch)	Q	
waveguide extension		
200 mm (8 inch) horn with 200 mm (8 inch)	R	
waveguide extension	"	
200 mm (8 inch) horn with 250 mm (10 inch)	S	
waveguide extension		
(Add Order code Y01 and plain text:		
"waveguide length mm")		

## Continuous level measurement - Radar transmitters

Selection and Ordering data	Article No.
SITRANS LR200, Flange adapter/Horn Antenna version	7ML5425-
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	Ш
Approvals General Purpose, CE, R&TTE, RCM General Purpose, CSA, FM, Industry Canada, FCC Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	A B C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC <sup>5)</sup>	D E F
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R <sup>6)7)</sup> Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R <sup>7)</sup> Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC <sup>5)7)</sup>	д Н
Pressure rating Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	0 1

- 1) Available with pressure rating option 1 only
- <sup>2)</sup> Maximum Process Temperature 60 °C (140 °F)
- 3) Available with Antenna Material option 0 and 1 only
- <sup>4)</sup> For stillpipe applications only
- 5) Available with enclosure option 2 only
- 6) Available with enclosure option 3 only
- 7) Available with communication option 2 only

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe $< 3.6 \text{ mA}^{1)}$	N07
Operating Instructions for HART/mA device	Article No.
English	A5E32337676
German	A5E34942758
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E31993614
Operating Instructions for PROFIBUS PA device	
English	A5E32337680
German  Note: The Operating Instructions should be ordered as a separate line item on the order.	A5E34942820
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32153438
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART <sup>2)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA <sup>3)</sup>	7ML1930-1AQ
One general purpose polymeric cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

<sup>1)</sup> Available with communication option 2 only

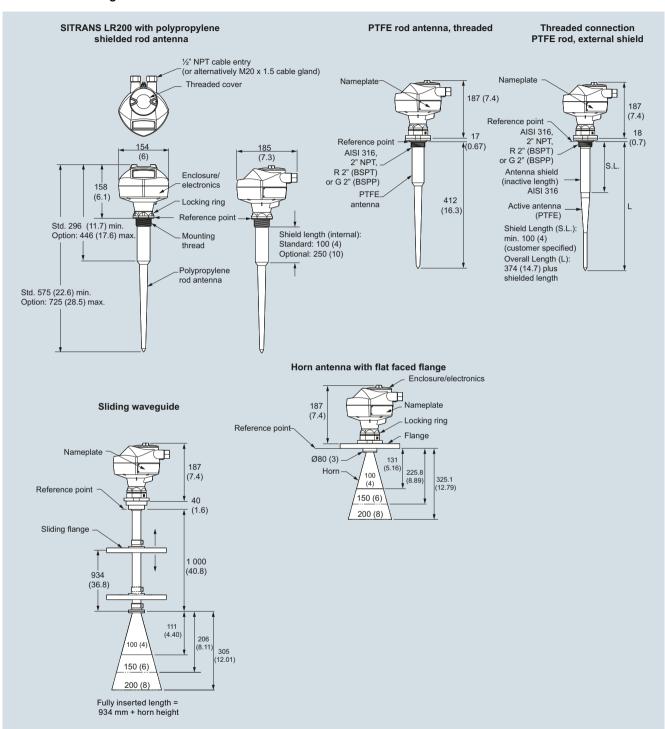
Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

<sup>3)</sup> Available with enclosure option 2 only

Continuous level measurement - Radar transmitters

### SITRANS LR200

# Dimensional drawings

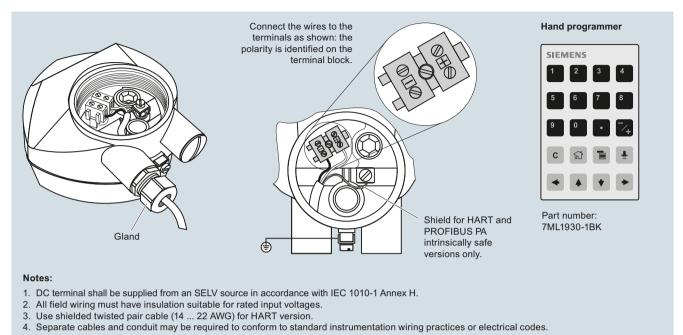


SITRANS LR200, dimensions in mm (inch)

Continuous level measurement - Radar transmitters

### **SITRANS LR200**

# Schematics



SITRANS LR200 connections

### Continuous level measurement - Radar transmitters

# **SITRANS LR200 Antennas**

# Integration



Antenna configurations for SITRANS LR200

# Technical specifications

Antenna Types	Flat Faced Flange with Rod	Shielded Rod	Horn (4", 6", 8" sizes available)
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch)	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)
Wetted parts	PTFE	PTFE, 316L stainless steel, FKM o-ring	316L stainless steel, PTFE, FKM o-ring
Extensions	50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) standard shield length	Use waveguide for extensions to 6 m (20 ft) long
Dielectric constant	> 3	> 3	> 3
Insertion length (max.)	41 cm (16.3 inch)	Variable	Variable with extension
Purging option (liquid or gas)	No	No	Yes
Sliding waveguide option for digesters <sup>1)</sup>	Yes	No	Yes
Weight <sup>2)</sup>	6.5 kg (14.3 lb)	5.0 kg (11 lb)	7.5 kg (16.5 lb)

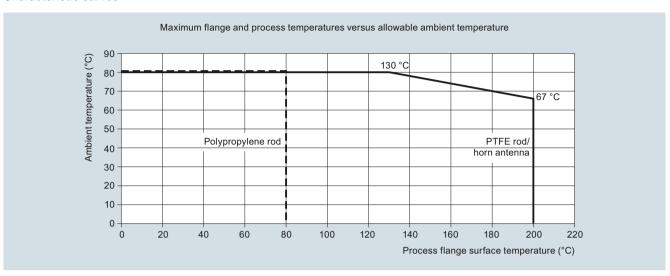
 $<sup>^{1)}</sup>$  Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)

<sup>&</sup>lt;sup>2)</sup> Not including extensions, includes SITRANS LR200 and smallest process connection

Continuous level measurement - Radar transmitters

# **SITRANS LR200 Antennas**

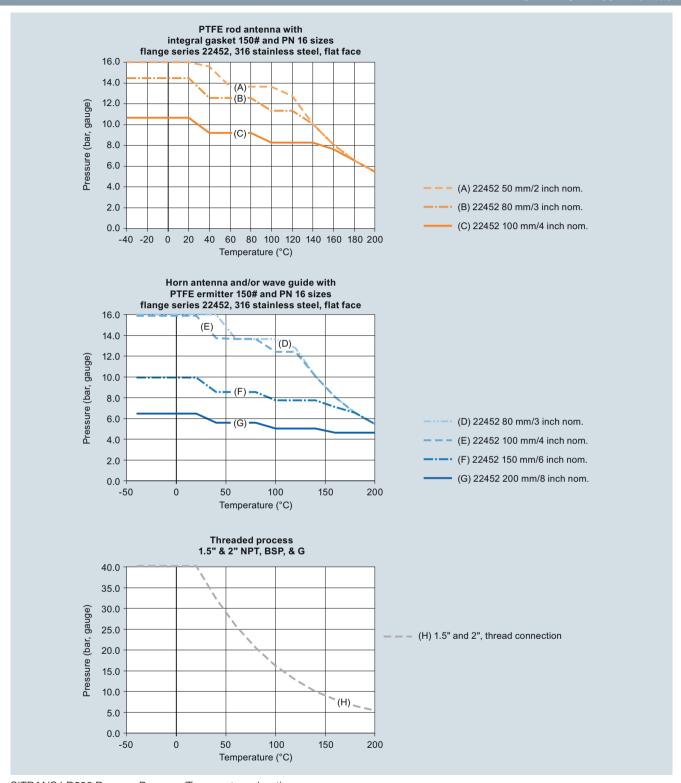
# Characteristic curves



SITRANS LR200 Ambient/Process Flange Surface Temperature Curve

### Continuous level measurement - Radar transmitters

### **SITRANS LR200 Antennas**



SITRANS LR200 Process Pressure/Temperature derating curves

Continuous level measurement - Radar transmitters

# SITRANS LR200 Specials

# Selection and ordering data

SITRANS LR200 Specials		SITRANS LR200 Specials	
	Article No.		Article No.
SITRANS LR200 PROFIBUS PA Aluminum Enclosure Kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna		SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection. <sup>5)</sup>	A5E03617085
SITRANS LR200 aluminum enclosure	A5E01483420	SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA.	A5E03617086
with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection. <sup>5)</sup>	A3E01403420	no process connection. <sup>5)</sup> SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT	A5E03617087
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection. <sup>5)</sup>	A5E01483440	cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection. <sup>5)</sup>	A========
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection. <sup>5)</sup>	A5E01483456	SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. <sup>5)</sup>	A5E03617088
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection. <sup>5)</sup>	A5E01483547	SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied)	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection. <sup>5)</sup>	A5E01483559		
SITRANS LR200 HART aluminum enclosure		80 mm (3 inch) horn antenna kit	PBD:25500K02A
kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for	<u> </u>	100 mm (4 inch) horn antenna kit	PBD:25500K03A
use with standard rod antenna		150 mm (6 inch) horn antenna kit	PBD:25500K05A
		200 mm (8 inch) horn antenna kit	PBD:25500K07A
		SITRANS LR200 Extension Kits for Horn Antenna with mounting screws	
SITRANS LR200 aluminum enclosure	A5E02956419	100 mm (4 inch) extension kit for horn antenna	PBD:25501K0100A
with board stack, LUI display, 5.8 GHz, M20	A3E02930419	150 mm (6 inch) extension kit for horn antenna	PBD:25501K0150A
cable inlet, approval option A, with HART communication start-up_at < 3.6 mA,		200 mm (8 inch) extension kit for horn antenna	PBD:25501K0200A
no process connection. <sup>5)</sup>		250 mm (10 inch) extension kit for horn antenna	PBD:25501K0250A
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20	A5E02956420	500 mm (20 inch) extension kit for horn antenna	PBD:25501K0500A
cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. <sup>5)</sup>		1 000 mm (40 inch) extension kit for horn antenna	PBD:25501K1000A
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection. <sup>5)</sup>	A5E02956421	SITRANS LR200 Flanged Rod Antenna Kit with 316L stainless steel flat faced flanges	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA,	A5E02956422	Flanged PTFE rod antenna kit, 2" ASME, 150 lb.	PBD: 51003K020AAAA
no process connection. <sup>5)</sup>		See drawing 51003 on http://www.siemens.com/radar <sup>1)4)</sup>	JIUUJKUZUAAAA
		Flanged PTFE rod antenna kit, DN 50 PN 16. See drawing 51003 on http://www.siemens.com/radar <sup>1)4)</sup>	PBD: 51003K050AJAA
		Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar <sup>1)4)</sup>	PBD: 51003K050AOAA

# Continuous level measurement - Radar transmitters

# SITRANS LR200 Specials

SITRANS LR200 Specials		SITRANS LR200 Specials		
	Article No.		Article No.	
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 1½"pipe thread process connection		SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L stainless steel 2" pipe thread process connection		
PTFE rod antenna kit, 1½" NPT 316L stainless steel process connection, FKM O-ring; See drawing 51004 on http://www.siemens.com/radar <sup>4</sup> ) PTFE rod antenna kit, R 1½" (BSPT).	PBD: 51004K1AAA PBD:	PTFE rod antenna shielded kit, 2" NPT 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar <sup>3)4)</sup>	PBD: 51002K0100AAA	
EN 10226 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar <sup>4)</sup>	51004K2AAA	PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L stainless steel process connec- tion, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar <sup>3)4)</sup>	PBD: 51002K0100BAA	
PTFE rod antenna kit, 1½" G 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar <sup>4)</sup>	PBD: 51004K3AAA	http://www.siemens.com/radar <sup>3)4)</sup> PTFE rod antenna shielded kit, 2" G 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel	PBD: 51002K0100CAA	
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 2" pipe thread process connection	Ť	shield. See drawing 51002 on http://www.siemens.com/radar <sup>3)4)</sup> SITRANS LR200 Horn Antenna Kit with 316L stainless steel flat faced flange, with PTFE emitter (without waveguide)		
PTFE rod antenna kit, 2" NPT 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar <sup>4</sup> )	PBD: 51005K1AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 3" horn, PTFE emitter 1)4)	PBD: 51006K020AAAA	
PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L stainless steel process connec- tion, FKM O-ring; see drawing 51005 on	PBD: 51005K2AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 4" horn, PTFE emitter 1)2)	PBD: 51006K020AABA PBD:	
http://www.siemens.com/radar <sup>4</sup> )  PTFE rod antenna kit, 2" G 316L stainless steel process connection, FKM O-ring; see drawing 51005 on	PBD: 51005K3AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 6" horn, PTFE emitter <sup>1)2)</sup> Horn antenna kit, 2" ASME 316L stainless steel flange 8" horn, PTFE emitter <sup>1)2)</sup>	51006K020AACA PBD: 51006K020AADA	
http://www.siemens.com/radar <sup>4)</sup>		Horn antenna kit, DN 50 PN 16 316L stainless steel flange 80 mm horn, PTFE emitter <sup>1)2)</sup> Horn antenna kit, DN 50 PN 16 316L stainless	PBD: 51006K050AJAA PBD:	
		steel flange 100 mm horn, PTFE emitter 1)2) Horn antenna kit, DN 50 PN 16 316L stainless	51006K050AJBA PBD:	
		steel flange 150 mm horn, PTFE emitter <sup>1)2)</sup> Horn antenna kit, DN 50 PN 16 316L stainless	51006K050AJCA PBD:	
		steel flange 200 mm horn, PTFE emitter <sup>1)2)</sup>	51006K050AJDA	

### Continuous level measurement - Radar transmitters

#### **SITRANS LR200 Specials**

### SITRANS LR200 Specials

SITRANS LR200 PTFE flanged rod antenna kit with 316L stainless steel shield and 316L stainless steel flat faced flange

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 100 mm 316L stainless steel shield.<sup>1)4)</sup>

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 100 mm 316L stainless steel shield. (1)4)

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 150 mm 316L stainless steel shield. 1)4)

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 150 mm 316L stainless steel shield. <sup>1)4</sup>)

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 200 mm 316L stainless steel shield. 1)4)

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 200 mm 316L stainless steel shield.<sup>1)4)</sup>

PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 250 mm 316L stainless steel shield. 1)4)

PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 250 mm 316L stainless steel shield.<sup>1)4)</sup> Article No.



PBD: 51014K0100AAA

PBD: 51014K0100EJA

PBD: 51014K0150AAA

PBD: 51014K0150EJA

PBD: 51014K0200AAA

PBD: 51014K0200EJA

PBD: 51014K0250AAA

PBD: 51014K0250EJA

SITRANS LR200 Specials	
	Article No.
PTFE paste	
Kit, PTFE paste, Tube, 250 mL	PBD:51036065
Cable gland	
One polymeric cable gland M20x1.5, rated -20 +80 °C (-4 +176 °F) for General Purpose and ATEX EEx e	7ML1930-1AN
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA	7ML1930-1AQ

Please contact ceg.smpi@siemens.com for special requests.

- 1) Available in flange sizes including ASME, DIN and JIS: please contact ceg.smpi@siemens.com.
- 2) Available with no pressure rating
- 3) Available in other shield lengths: please contact ceg.smpi@siemens.com.
- Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 4/193.

#### Continuous level measurement - Radar transmitters

### **SITRANS LR250 Horn Antenna**

# Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

#### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

### Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn antenna options and decreasing sensitivity to obstructions

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without saving to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

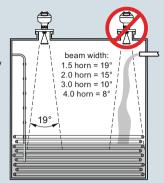
 Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

### Configuration

#### Installation

#### Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the horn antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.
- Use largest possible antenna.

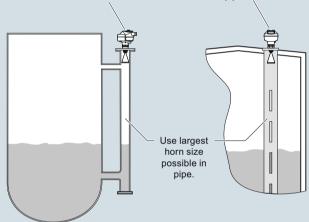


#### Mounting unit on bypass

# Mounting unit on stilling well

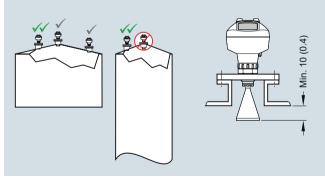
Orient front or back of Orient front or back of device device toward vent.

Orient front or back of device toward stillpipe slots.



### Mounting unit on vessel

### Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# **SITRANS LR250 Horn Antenna**

Technical specifications		
Mode of operation		Process connections
Measuring principle	Radar level measurement	<ul> <li>Process connectio</li> </ul>
Frequency	K-band (25.0 GHz)	
Minimum measuring range	50 mm (2 inch) from end of antenna	
Maximum measuring range	20 m (65 ft), antenna dependent	Flange connection
Output		• Flange connection
HART:	Version 5.1	Power supply
Analog output	4 20 mA	4 20 mA/HART
Accuracy     Fail-safe	<ul><li>± 0.02 mA</li><li>Programmable as high low or hold (loss of echo)</li><li>NE 43 programmable</li></ul>	PROFIBUS PA
PROFIBUS PA: • Function blocks	Profile 3.01 2 Analog Input (AI)	FOUNDATION Fields
FOUNDATION Fieldbus	H1	Certificates and ap
Functionality	Basic or LAS	General
<ul><li>Version</li><li>Function blocks</li></ul>	ITK 5.2.0 2 Analog Input (AI)	Radio
Performance (according to refer-	2 Analog Input (Al)	
ence conditions IEC60770-1)		Hazardous • Explosion Proof (B
Maximum measured error	3 mm (0.118 inch)	
Influence of ambient temperature	< 0.003 %/K	Increased Safety (
Rated operating conditions		<ul> <li>Intrinsically Safe (E</li> </ul>
Installation conditions • Location	Indoor/outdoor	• Explosion Proof (C
Ambient conditions (enclosure)	40 .00 %C / 40 176 %E)	- Intrinsis all Cofe (6
<ul><li>Ambient temperature</li><li>Installation category</li></ul>	-40 +80 °C (-40 +176 °F)	Intrinsically Safe (0)
Pollution degree	4	• Non inconding (Co
Medium conditions		Non-incendive (Ca
Dielectric constant $\epsilon_{\text{r}}$	> 1.6, antenna and application dependent	<ul> <li>Flame Proof/Increa (China)</li> </ul>
Process temperature	-40 +200 °C (-40 +392 °F) (at process connection with FKM O-ring)	Intrinsically Safe (Control of the Control of
	-20 +200 °C (-4 +392 °F) (at process connection with	<ul><li>Non-sparking (Chi</li><li>Intrinsically Safe (E</li></ul>
Process pressure	FFKM O-ring)  Up to 40 bar g (580 psi g), process connection and temperature depen-	<ul><li>Non-sparking (Euro</li><li>Flame Proof (Internation)</li></ul>
	dent.	
<u>.</u>	See Pressure/Temperature curves for more information	<ul> <li>Increased Safety (International/Euro</li> </ul>
Design		Intrinsically Safe (I
Enclosure  • Material	Aluminum, polyester powder-coated	, ,
Cable inlet	2 x M20x1.5 or 2 x ½" NPT	• Explosion Proof (R
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	<ul><li>Increased Safety (Intrinsically Safe (F</li></ul>
Weight	< 3 kg (6.6 lb) 3.75 mm (1½ inch) threaded connection with 1½" horn antenna	<ul><li>Marine</li></ul>
Display (local)	Graphic local user interface including quick start wizard and echo profile display	Functional Safety
Antenna		
Material	316L stainless steel	
	[optional alloy N06022/2.4602 (Hastelloy C-22 or equivalent)]	
Dimensions (nominal horn sizes)	Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn and optional 100 mm (4 inch) horn extension	

Process connections	
Process connection	1½", 2" or 3" NPT [(Taper), ANSI/ASME B1.20.1] R 1½", 2" or 3" [(BSPT), EN 10226]
Flange connection	G 1½", 2" or 3" [(BSPP), EN ISO 228-1] 2", 3", 4" (ANSI 150, 300 lb),
3	50, 80, 100 mm (PN 16, 40, JIS 10K)
Power supply	
4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 $\Omega$
PROFIBUS PA	• 15 mA • Per IEC 61158-2
FOUNDATION Fieldbus	• 20.0 mA • Per IEC 61158-2
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
<ul> <li>Flame Proof/Increased Safety (China)</li> </ul>	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C
Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C
Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia IIIC T100 °C Da ATEX II 3G Ex nA IIC T4 Gc
<ul> <li>Non-sparking (Europe)</li> <li>Flame Proof (International/Europe)</li> </ul>	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
<ul> <li>Increased Safety (International/Europe)</li> </ul>	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Intrinsically Safe (International)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
<ul> <li>Explosion Proof (Russia)</li> </ul>	GOST-R Ex d
<ul> <li>Increased Safety (Russia)</li> </ul>	GOST-R Ex e
Intrinsically Safe (Russia)	GOST-R Ex ia
Marine	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li><li>Bureau Veritas</li></ul>
Functional Safety	SII -2 suitable in accordance with

SIL-2 suitable in accordance with IEC 61508/61511

Continuous level measurement - Radar transmitters

Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C $T_a$ = -20 +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 $T_a$ = +50 °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM     Emerson AMS     SITRANS DTM     (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

# Continuous level measurement - Radar transmitters

Selection and Ordering data	Α	Article No.	
SITRANS LR250 horn antenna	7	ML5431-	
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.	•	0 -	
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process Connection and Antenna Material 316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal 1)			
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal 1) Hastelloy C-22/2.4602 (or equivalent), PTFE emitter,	2		
FKM seal <sup>2)</sup> Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal <sup>2)</sup>	3	3	
Process Connection Type			
Threaded connection 316L  1½" NPT (ASME B1.20.1) (tapered thread) <sup>3)</sup> R 1½" [(BSPT), EN 10226-1] (tapered thread) <sup>3)</sup> G 1½" [(BSPP), EN ISO 228-1] (parallel thread) <sup>3)</sup>	,	A A A B A C	
2" NPT (ASME B1.20.1) (tapered thread) R 2" [(BSPT), EN 10226-1] (tapered thread) G 2" [(BSPP), EN ISO 228-1] (parallel thread)		A D A E A F	
3" NPT (ASME B1.20.1) (tapered thread) R 3" [(BSPT), EN 10226-1] (tapered thread) G 3" [(BSPP), EN ISO 228-1] (parallel thread)		A G A H A J	
Flanged connection 316L 2" Class 150 ASME B16.5 flat faced <sup>4)</sup> 3" Class 150 ASME B16.5 flat faced <sup>4)</sup> 4" Class 150 ASME B16.5 flat faced <sup>4)</sup>	,	B A B B B C	
2" Class 300 ASME B16.5 flat faced <sup>4)</sup> 3" Class 300 ASME B16.5 flat faced <sup>4)</sup> 4" Class 300 ASME B16.5 flat faced <sup>4)</sup>		C A C B C C	
DN 50 PN 16 EN 1092-1 Type A flat faced <sup>4)</sup> DN 80 PN 16 EN 1092-1 Type A flat faced <sup>4)</sup> DN 100 PN 16 EN 1092-1 Type A flat faced <sup>4)</sup>		D A D B D C	
DN 50 PN 40 EN 1092-1 Type A flat faced <sup>4)</sup> DN 80 PN 40 EN 1092-1 Type A flat faced <sup>4)</sup> DN 100 PN 40 EN 1092-1 Type A flat faced <sup>4)</sup>		E A E B E C	
50A 10K JIS B 2220 flat faced <sup>4)</sup> 80A 10K JIS B 2220 flat faced <sup>4)</sup> 100A 10K JIS B 2220 flat faced <sup>4)</sup>	,	F A F B F C	
DN 50 PN 16 DIN EN 1092-1 Type B1 raised face DN 80 PN 16 DIN EN 1092-1 Type B1 raised face DN 100 PN 16 DIN EN 1092-1 Type B1 raised face		G A G B G C	
DN 150 PN 16 DIN EN 1092-1 Type B1 raised face DN 50 PN 40 DIN EN 1092-1 Type B1 raised face DN 80 PN 40 DIN EN 1092-1 Type B1 raised face		G D H A H B	
DN 100 PN 40 DIN EN 1092-1 Type B1 raised face DN 150 PN 40 DIN EN 1092-1 Type B1 raised face		H C H D	

Selection and Ordering data	Article No.		
SITRANS LR250 horn antenna	7ML5431-		
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.	0 -		
Flanged connection Hastelloy C 2" Class 150 ASME B16.5 raised faced <sup>4</sup> ) 3" Class 150 ASME B16.5 raised faced <sup>4</sup> ) 4" Class 150 ASME B16.5 raised faced <sup>4</sup> ) 2" Class 300 ASME B16.5 raised faced <sup>4</sup> ) 3" Class 300 ASME B16.5 raised faced <sup>4</sup> ) 4" Class 300 ASME B16.5 raised faced <sup>4</sup> ) DN 50 PN 16 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 80 PN 16 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 100 PN 16 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 50 PN 40 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 50 PN 40 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 80 PN 40 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 100 PN 40 EN 1092-1 Type B1 raised faced <sup>4</sup> ) DN 100 PN 40 EN 1092-1 Type B1 raised faced <sup>4</sup> ) 50A 10K JIS B 2220 raised faced <sup>4</sup> ) 100A 10K JIS B 2220 raised faced <sup>4</sup> ) DN 50 PN 16 EN 1092-1 Type B1 raised face DN 80 PN 16 EN 1092-1 Type B1 raised face DN 150 PN 16 EN 1092-1 Type B1 raised face DN 150 PN 40 EN 1092-1 Type B1 raised face DN 50 PN 40 EN 1092-1 Type B1 raised face DN 50 PN 40 EN 1092-1 Type B1 raised face DN 50 PN 40 EN 1092-1 Type B1 raised face DN 100 PN 40 EN 1092-1 Type B1 raised face	JA JB JC JD JE JF KA KB KC KD KE KF LA LB LC MA MB MC MD ME MF MG MH		
Communication/Output PROFIBUS PA 4 20 mA, HART, start-up at < 3.6 mA FOUNDATION Fieldbus	1 2 3		
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT 2 x M20x1.5	0 1		
Antenna			
1½" horn 2" horn (fits 2" ASME or DN 50 nozzles) 3" horn (fits 3" ASME or DN 80 nozzles) 4" horn (fits 4" ASME or DN 100 nozzles) 1½" horn with 100 mm extension 2" horn with 100 mm extension	A B C D E F		
3" horn with 100 mm extension 4" horn with 100 mm extension Hastelloy C22 (or equivalent) 2" horn (fits 2" ASME or DN 50 nozzles) 3" horn (fits 3" ASME or DN 80 nozzles) 4" horn (fits 4" ASME or DN 100 nozzles)	G H J K L		
2" horn (fits 2" ASME or DN 50 nozzles) with 100 mm extension 3" horn (fits 3" ASME or DN 80 nozzles) with 100 mm extension 4" horn (fits 4" ASME or DN 100 nozzles) with 100 mm extension	M N P		
100 mm Oxtonolon			

Continuous level measurement - Radar transmitters

Selection and Ordering data	Article No.
SITRANS LR250 horn antenna	7ML5431-
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.	0 -
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM●	A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A,  B, C, D, Class II, Div.1, Groups E,F, G, Class III T4 FCC, Industry Canada	В
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	С
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	E
Increased Safety: IECEx/ATEX II 1/2 GD,1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>5)</sup>	F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb  ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>5)</sup>	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada <sup>5)</sup>	н
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C <sup>5)</sup>	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, $\bullet$ Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C <sup>5)</sup>	N
Pressure rating	
Rating per Pressure/Temperature curves in manual • 0.5 bar g (7.25 psi g) maximum •	0 1
4)	

- $^{1)}\,$  Available with process connection options AA ... HD & Antenna Versions A ... H only
- 2) Available with process connection options JA ... MH & Antenna Versions J ... P only
- 3) Available For antenna versions A and E only, max. range 10 m (32.8 ft), dk > 3. Can measure dk > 1.6 [20 m (65.6 ft)] when mounted in a stillpipe/ bypass.
- 4) Siemens Milltronics type flange (flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard), see operating instructions for details
- 5) Applicable with communication option 2 only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

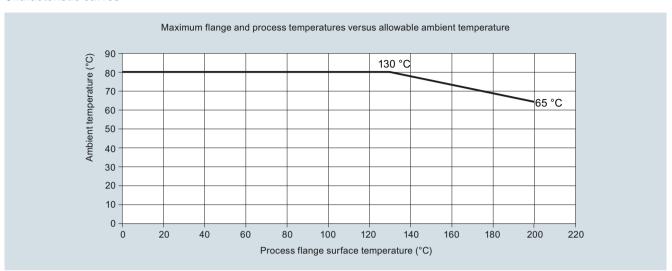
# Continuous level measurement - Radar transmitters

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs	01401 0040	Operating Instructions for	7 11 11010 1 40.
Please add "-Z" to Article No. and specify Order		FOUNDATION Fieldbus device	4550004444
code(s).		English	A5E32221411
Plug M12 with mating Connector 1)2)3)	7.00	German	A5E32376112
Plug 7/8" with mating Connector <sup>2)3)4)</sup>	A55	French	A5E35108601
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:  Measuring-point number/identification (max. 27 characters); specify in plain text	Y15	Note: The Operating Instructions should be ordered as a separate line item on the order.  Compact Operating Instructions for	
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	FOUNDATION Fieldbus device  English, French, German, Spanish, Italian, Dutch,	A5E33472700
Inspection certificate 3.1 of EN 10204	C12	Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A3E33472700
Functional Safety (SIL 2). Device suitable for use in  accordance with IEC 61508 and IEC 61511 <sup>3)5)</sup>	C20	English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian,	A5E33472738
Namur NE43 compliant, device preset to failsafe < 3.6 mA <sup>5)</sup>	N07	Slovenian	
Operating Instructions for HART/mA device	Article No.	English, Portuguese (Brazil), Chinese	A5E34046626
English	A5E32220602	This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operations that the state of the ATEX Compact Operations and the state of the ATEX Compact Operations and the state of the ATEX Compact Operations and the ATEX Com	
German	A5E32376088	ing Instructions and Operating Instructions library.	
French	A5E35108592	Accessories	==== .==.
Note: The Operating Instructions should be ordered as a separate line item on the order.		Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
Compact Operating Instructions for HART/mA		HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
device  English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal),	A5E33469191	One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART (two are required)	7ML1930-1AP
Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian,	A5E33469171	One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) <sup>6)</sup>	7ML1930-1AQ
Slovenian English, Portuguese (Brazil), Chinese	A5E34046583	FDA approved FKM o-ring for 2" G (BSPP) process connections -28 +80 °C (-28 +176 °F)	7ML1830-3AN
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operat-		SITRANS RD100, loop powered display - see Chapter 7	7ML5741
ing Instructions and Operating Instructions library.  Operating Instructions for PROFIBUS PA device		SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
English	A5E32221386	SITRANS RD300, dual line display with totalizer	7ML5744
German	A5E32376094	and linearization curve and Modbus conversion - see Chapter 7	
French	A5E35108597	SITRANS RD500 web, universal remote monitoring	7ML5750
Note: The Operating Instructions should be ordered as a separate line item on the order.		solution for instrumentation - see Chapter 7 For applicable back up point level switch -	7 III 207 00 III
Compact Operating Instructions for PROFIBUS PA device		see point level measurement section	
English, French, German, Spanish, Italian, Dutch,	A5E33469239	<ol> <li>Available with enclosure option 1 only</li> <li>To be used with communication options 1 and 3 only.</li> </ol>	
Danish, Finnish, Greek, Portuguese (Portugal),  Swedich			h approval antian C
English, Bulgarian, Czech, Estonian, Hungarian,	A5E33472685	for use on intrinsically safe applications only. Not rate	d for dust Ex.
Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		4) Available with enclosure option 0 only	
English, Portuguese (Brazil), Chinese	A5E34046624	5) Applicable to communication option 2 only	
This device is shipped with the Siemens Milltronics	AJEJ4040024	<sup>6)</sup> For use with communication option 1 and 3 only	
manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		<ul> <li>We can offer shorter delivery times for configurations Quick Ship Symbol</li> <li>For details see page 9/5 in the</li> </ul>	

# Continuous level measurement - Radar transmitters

# **SITRANS LR250 Horn Antenna**

# Characteristic curves



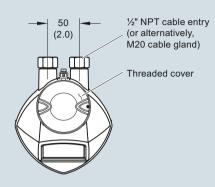
SITRANS LR250 Ambient/Process Flange Surface Temperature Curve

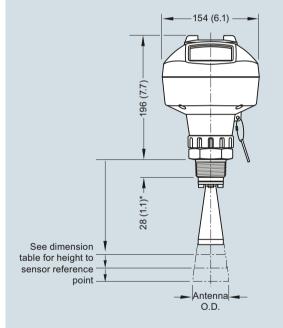
Continuous level measurement - Radar transmitters

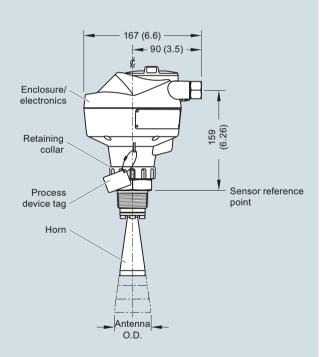
# **SITRANS LR250 Horn Antenna**

# Dimensional drawings

### Threaded Horn Antenna







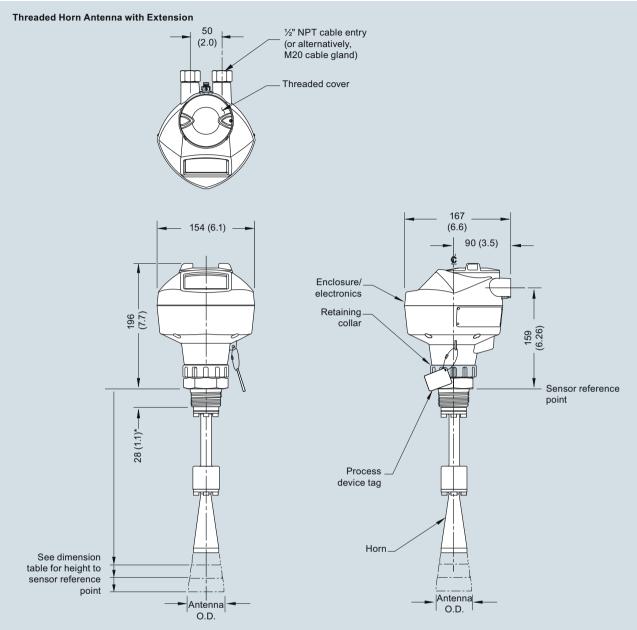
\*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement
.,,,,,		1-1/2" threaded connection	2" threaded connection	3" threaded connection		range
1.5" horn	139.8 (5.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	147.8 (5.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	174.8 (6.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	194.8 (7.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# **SITRANS LR250 Horn Antenna**



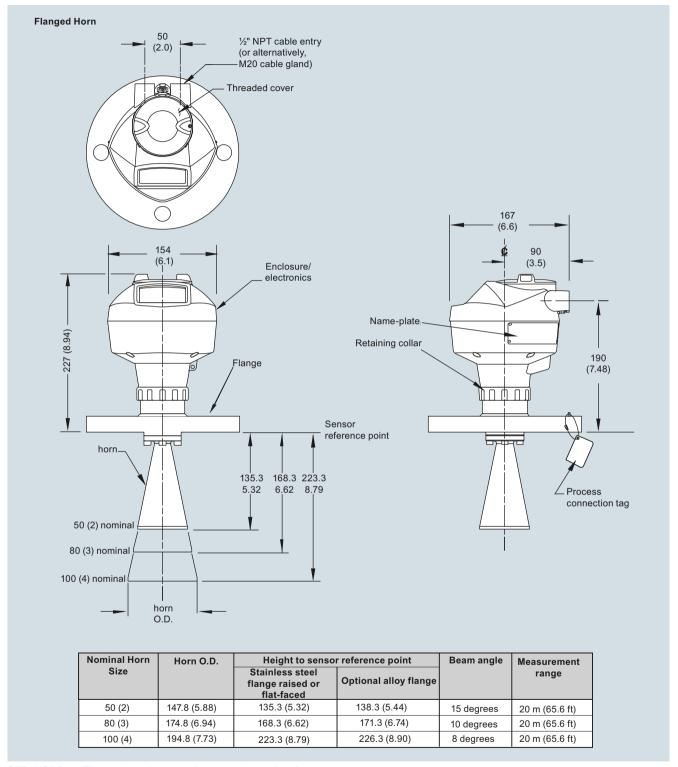
\*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Heigh	Beam angle	Measurement		
Турс		1-1/2" threaded connection	2" threaded connection	3" threaded connection		range
1.5" horn	139.8 (5.57)	235 (9.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	147.8 (5.88)	N/A	266 (10.55)	280 (11.09)	15 degrees	20 m (65.6 ft)
3" horn	174.8 (6.94)	N/A	299 (11.85)	313 (12.39)	10 degrees	20 m (65.6 ft)
4" horn	194.8 (7.73)	N/A	354 (14)	368 (14.55)	8 degrees	20 m (65.6 ft)

 ${\it SITRANS\ LR250\ Threaded\ Horn\ Antenna\ with\ Extension,\ dimensions\ in\ mm\ (inch)}$ 

Continuous level measurement - Radar transmitters

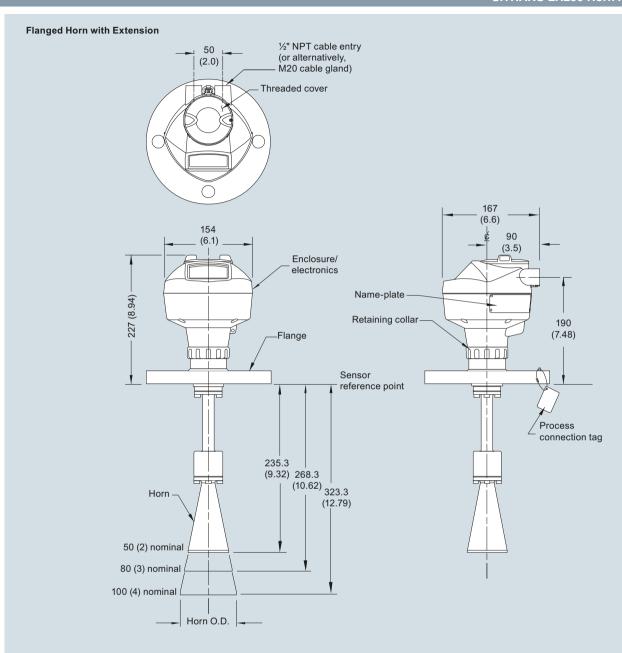
# SITRANS LR250 Horn Antenna



SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# **SITRANS LR250 Horn Antenna**



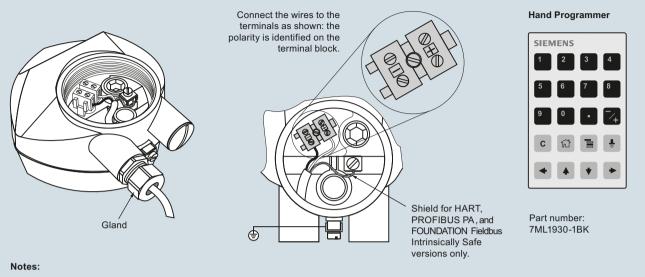
Nominal Horn	Horn O.D.	Height to senso	r reference point	Beam angle	Measurement
Size		Stainless steel flange raised or flat-faced	Optional alloy flange		range
50 (2)	147.8 (5.88)	235.3 (9.32)	238.3 (9.44)	15 degrees	20 m (65.6 ft)
80 (3)	174.8 (6.94)	268.3 (10.62)	271.3 (10.74)	10 degrees	20 m (65.6 ft)
100 (4)	194.8 (7.73)	323.3 (12.79)	326.3 (12.90)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Flanged Horn Antenna with Extension, dimensions in mm (inch)

Continuous level measurement - Radar transmitters

# **SITRANS LR250 Horn Antenna**

# Schematics



- 1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
- 2. All field wiring must have insulation suitable for rated input voltages.
- 3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- 4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Specials

# Selection and ordering data

with PROFIBUS PA communication, no process connection  LR250 horn version enclosure with board stack, A5E01156838 SITRANS LR250 horn v	rersion enclosure with e inlet, approval option A, tion start-up at < 3.6 mA, rersion enclosure with e inlet, approval option C,	Article No.  A5E02956317
(< 3.6 mÅ start-up HAI  LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection  LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	rersion enclosure with e inlet, approval option A, tion start-up at < 3.6 mA, rersion enclosure with e inlet, approval option C,	A5E02956317
NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection  LR250 horn version enclosure with board stack, M20 cable with HART communication no process connection  SITRANS LR250 horn v	e inlet, approval option A, tion start-up at < 3.6 mA, rersion enclosure with e inlet, approval option C,	A5E02956317
MOO and the field and and the Moo Entered the	e inlet, approval option C,	
M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection board stack, M20 cable with HART communication no process connection no process connection		A5E02956319
	e inlet, approval option E, tion start-up at < 3.6 mA,	A5E02956320
LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection  A5E01156841  SITRANS LR250 horn v board stack, M20 cable with HART communication no process connection	rersion enclosure with e inlet, approval option F, tion start-up at < 3.6 mA,	A5E02956322
	e inlet, approval option G, tion start-up at < 3.6 mA,	A5E02956323
LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication,  A5E01156844  LR250 horn version encount of the communication with PROFIBUS PA communication,	closure with board stack,	A5E03441096
LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication,  A5E01156846  LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, NPT cable inlet, approval option C	closure with board stack, val option B, with HART o at < 3.6 mA, no process	A5E03441097
M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection  ABEU1156848  ABEU1156848  LR250 horn version end NPT cable inlet, approval option End of the communication	closure with board stack, val option D, with HART o at < 3.6 mA, no process	A5E03441098
with FOUNDATION FIELDBUS communication, no process connection NPT cable inlet, approve communication start-up	closure with board stack, val option H, with HART o at < 3.6 mA, no process	A5E03441099
LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION FIELDBUS communication, no process connection  A5E03769539  Connection  SITRANS LR250 horn extension kits	antenna and	T
LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION FIELDBUS communication, no process connection		
SITRANS LR250 horn version enclosures (FOUNDATION Fieldbus models)  38 mm (1.5 inch) horn a 1.5" Process Connection	antenna kit, ins only	A5E01151539
100 mm (4 inch) horn a 1.5" Process Connectio	ns only	A5E01151553
	steel 316L horn antenna kit	A5E01151569
LR250 horn version enclosure with board stack, A5E02654608	steel 316L horn antenna kit	A5E01151571
with FOUNDATION Fieldbus communication, no process connection 100 mm (4 inch) horn a		A5E01151573 A5E01151577
LR250 horn version enclosure with board stack, NPT cable inlet approval option A  A5E02653792 (4 inch) process conne		A5E01151584
with CONDATION Federal Communication,	itenna kit, Hastelloy C-22	A5E01151585
L P250 horn vorgion analogura with board stack	ntenna kit, Hastelloy C-22	A5E01151587
with FOUNDATION Fieldbus communication, 5 Dupont 1Gr Polyback	k, PTFE grease kit	A5E01151626
no process connection  LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection		A5E02465410

Continuous level measurement - Radar transmitters

### SITRANS LR250 threaded PVDF antenna

### Overview



SITRANS LR250 with threaded PVDF antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe.

### Benefits

- Fully insulated PVDF antenna design for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART or PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Suitable for use in Safety Related Systems in accordance with IEC 61508/61511 (SIL-2)
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

### Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

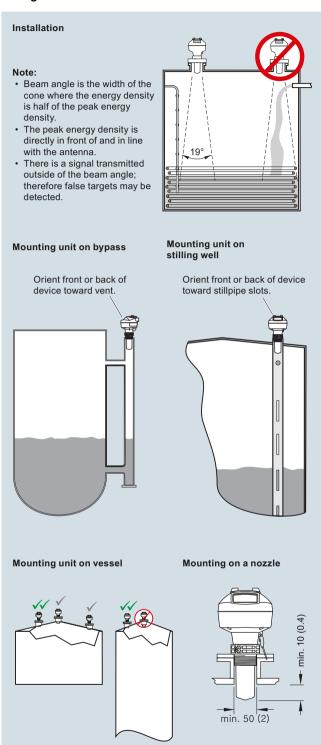
SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 10 m (32 ft) on materials with dk > 3 or 20 m (66 ft) when used in a stilling pipe with dk  $\geq$  1.6.

 Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 80 °C (176 °F), corrosive and aggressive materials and applications requiring functional safety

Continuous level measurement - Radar transmitters

# SITRANS LR250 threaded PVDF antenna

# Configuration



SITRANS LR250 PVDF antenna installation, dimensions in mm (inch)

Continuous level measurement - Radar transmitters

# SITRANS LR250 threaded PVDF antenna

Technical specifications			
Mode of operation		Certificates and approvals	
Measuring principle	Radar level measurement	General	CSA <sub>US/C</sub> , CE, FM, NE 21, RCM
Frequency	K-band (25.0 GHz)	Radio	FCC, Industry Canada and
Minimum measuring range	50 mm (2 inch) from end of antenna		Europe ETSI EN 302-372, RCM
Maximum measuring range	10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe with dk ≥ 1.6	Hazardous • Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb,
Output	314	Increased Safety (Brazil)	Ex ia ta IIIC T100 °C Da INMETRO Ex e ia mb IIC T4 Ga/Gb.
HART	Version 5.1		Ex ia ta IIIC T100 °C Da
<ul><li>Analog output</li><li>Accuracy</li></ul>	4 20 mA + 0.02 mA	<ul> <li>Intrinsically Safe (Brazil)</li> </ul>	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Fail-safe	Programmable as high low or hold (loss of echo)  NE 43 programmable	Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
PROFIBUS PA • Function blocks	Profile 3.1 2 Analog Input (AI)	Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
FOUNDATION Fieldbus	H1	Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
<ul><li>Functionality</li><li>Version</li><li>Function blocks</li></ul>	Basic or LAS ITK 5.2.0 2 Analog Input (AI)	<ul> <li>Flame Proof/Increased Safety (China)</li> </ul>	Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T₄90 °C
Performance (according to reference conditions IEC60770-1)	2 Arialog Iriput (Al)	• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch)	<ul><li>Non-sparking (China)</li><li>Intrinsically Safe (Europe)</li></ul>	NEPSI Ex nA IIC T4 Gc ATEX II 1G Ex ia IIC T4 Ga
	• < 500 mm from sensor reference point: 25 mm (1 inch)	<ul> <li>Non-sparking/Energy Limited (Europe)</li> </ul>	ATEX II 1D Ex ia ta IIC T100 °C Da ATEX II 3G Ex nA IIC T4 Gc
Influence of ambient temperature	< 0.003 %/K	Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb,
Rated operating conditions			Ex ia ta IIC T100 °C Da
Installation conditions  • Location	Indoor/outdoor	<ul> <li>Increased Safety (International/Europe)</li> </ul>	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Ambient conditions (enclosure)     Ambient temperature	-40 +80 °C (-40 +176 °F)	• Intrinsically Safe (International)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C
<ul><li>Installation category</li><li>Pollution degree</li></ul>	1	Explosion Proof (Russia)	Da GOST-R Ex d
Medium conditions		Increased Safety (Russia)	GOST-R Ex e
Dielectric constant $\varepsilon_r$	≥ 3 (1.6 in stillpipe)	Intrinsically Safe (Russia)	GOST-R Ex ia
Process temperature	-40 +80 °C (-40 +176 °F) at process connection (Is suitable for	Marine	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li><li>Bureau Veritas</li></ul>
Process pressure	CIP at 120 °C for 1/2 hr max.) Up to 5 bar g (72 psi g) temperature	Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511
	dependent. See Pressure/Temperature curves for more information	Programming Intrinsically Safe Siemens handheld	Infrared receiver
Design		programmer	
Enclosure • Material	Aluminum, polyester powder-coated	Approvals for handheld programmer	ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T <sub>a</sub> = -20 +50 °C
Cable inlet  Degree of protection	2 x M20x1.5 or 2 x ½" NPT  Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T <sub>a</sub> = +50 °C
Weight	approximately 3.3 kg (7.27 lb)	Handheld communicator	IECEx SIR 09.0073  HART communicator 375/475
Display (local)	Graphic local user interface	PC	• SIMATIC PDM
Antenna	including quick start wizard and echo profile display		<ul> <li>Emerson AMS</li> <li>SITRANS DTM (for connection into FDT, such as</li> </ul>
<ul><li>Material</li><li>Dimensions (nominal sizes)</li></ul>	PVDF (Polyvinylidene fluoride) 2 inch (48 mm)	Display (local)	PACTware or Fieldcare)  Graphic local user interface including
Process connection  Process connection	2" NPT [(Taper), ASME B1.20.1]		quick start wizard and echo profile displays
- 1 100622 0011118011011	2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]		
Power supply	- · · · · · · · · · · · · · · · · · · ·		
4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 $\Omega$		

PROFIBUS PA

FOUNDATION Fieldbus

• 15 mA • per IEC 61158-2

• 20.0 mA • per IEC 61158-2

# Continuous level measurement - Radar transmitters

# SITRANS LR250 threaded PVDF antenna

election and Ordering data	-	Arti	cle	e N	lo.			
ITRANS LR250 threaded PVDF antenna		7MI	L5	43 <sup>-</sup>	1-			
-wire, 25 GHz pulse radar level transmitter for ontinuous monitoring of liquids and slurries in torage and process vessels including corrosives raggressive materials, to a range of 10 m (32.8 ft) r 20m (66ft) when used in a stilling pipe.		ľ		0	-		ľ	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	П							
rocess Connection and Antenna Material hreaded PVDF antenna	•	4						
rocess Connection Type								
hreaded connections PVDF "NPT (ASME B1.20.1) (tapered thread) 2" [(BSPT), EN 10226-1] (tapered thread) i 2" [(BSPP), EN ISO 228-1] (parallel thread)	• • •	P P P	В					
ommunication/Output								
ROFIBUS PA 20 mA, HART, start-up at < 3.6 mA OUNDATION Fieldbus	•			1 2 3				
nclosure/Cable inlet luminum, Epoxy painted x ½" NPT	•					0		
x M20x1.5	•					1		
intenna						,	3	
inch(50 mm) threaded PVDF antenna	•					ı		
. <b>pprovals</b> ieneral Purpose, CE, CSA, FM, FCC, R&TTE, RCN	1						A	
trinsically Safe: CSA/FM Class I, Div. 1, Groups A, , C, D, Class II, Div.1, Groups E ,F, G, Class III T4 CC, Industry Canada							В	
ntrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, ECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, UMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, E, R&TTE, RCM							С	
lon-incendive: CSA/FM Class I, Div. 2, Groups A, , C, D T5, FCC, Industry Canada	•						D	)
lon Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, &TTE, RCM	•						Ε	
ncreased Safety: IECEx/ATEX II 1/2 GD,1D, D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Ia, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC 100°C Da, CE, R&TTE, RCM <sup>1)</sup>	•						F	
lameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb I IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, IMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC 100 °C Da, CE, R&TTE, RCM <sup>1)</sup>	•						G	
xplosion proof: CSA/FM Class I, II and III, Div. 1, iroups A, B, C, D, E, F, G, FCC, Industry Canada <sup>1</sup>	•						Н	
lon Sparking: NEPSI Ex nA IIC T4 Gc	٠						K	
ntrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 90 IP67 DIP A20 T <sub>A</sub> 90 °C	•						L	
lameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, x iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C <sup>1)</sup>	•						M	
							N	
ncreased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, x iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C <sup>1)</sup>								

- 1) Applicable to Communication option 2 only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data  O  Further designs	Order code
Further designs	
Turtific designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating Connector <sup>1)2)3)</sup> • A	<b>\50</b>
Plug 7/8" with mating Connector <sup>2)3)4)</sup>	<b>\</b> 55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Y Measuring-point number/identification (max. 27 characters); specify in plain text	/15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	211
Inspection Certificate Type 3.1 per EN 10204 C	C12
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 <sup>5)6)</sup>	20
Namur NE43 compliant, device preset to failsafe $\bullet$ Ne $< 3.6 \mathrm{mA}^{5}$	107
Operating Instructions for HART/mA device Ar	Article No.
English A:	A5E32220602
German A:	A5E32376088
French A:	A5E35108592
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for HART/mA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171
English, Portuguese (Brazil), Chinese	A5E34046583
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Operating Instructions for PROFIBUS PA device	
English	A5E32221386
German	A5E32376094
French	A5E35108597
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for PROFIBUS PA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685
English, Portuguese (Brazil), Chinese	A5E34046624
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Continuous level measurement - Radar transmitters

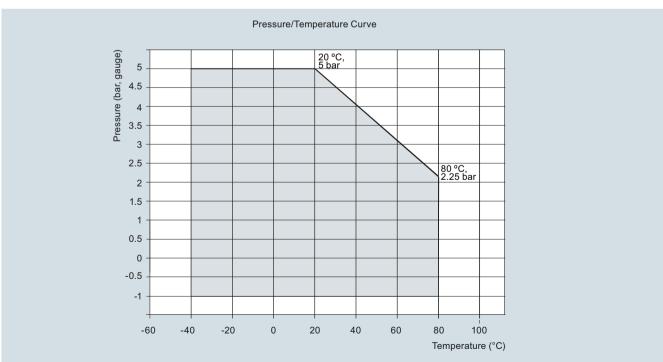
# SITRANS LR250 threaded PVDF antenna

Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	A5E32221411
German	A5E32376112
French	A5E35108601
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
English, Portuguese (Brazil), Chinese	A5E34046626
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	

Selection and Ordering data	Article No.
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA and FOUNDATION Fieldbus <sup>2)</sup>	7ML1930-1AQ
FDA approved FKM o-ring for 2" G (BSPP) process connections -28 +80 °C (-28 +176 °F)	7ML1830-3AN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

<sup>1)</sup> Available with Enclosure option 1 only

# Characteristic curves



SITRANS LR250 PVDF antenna pressure/temperature curve

<sup>2)</sup> To be used with Communication options 1 and 3 only. Connector has IP67 rating.

<sup>3)</sup> Available with Approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.

 $<sup>^{</sup>m 4)}$  Available with Enclosure option 0 only

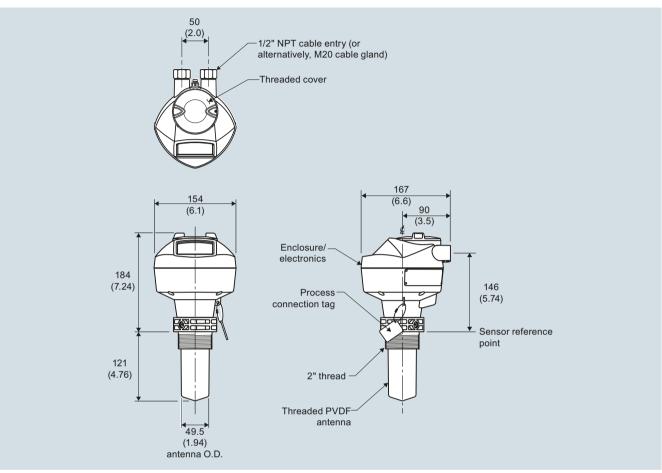
 $<sup>^{5)}</sup>$  Available with communication option 2 only

 $<sup>^{\</sup>rm 6)}$  Available with approval options A, B, C, D, E, K and L only

### Continuous level measurement - Radar transmitters

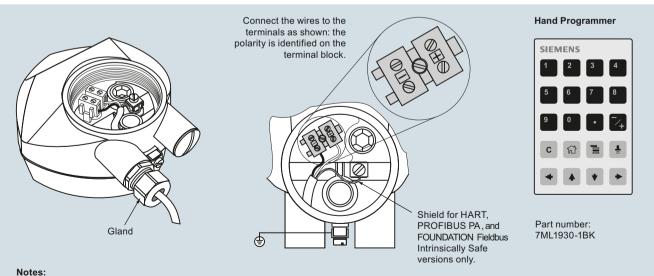
### SITRANS LR250 threaded PVDF antenna

# Dimensional drawings



SITRANS LR250 PVDF antenna, dimensions in mm (inch)

### Schematics



- 1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
- 2. All field wiring must have insulation suitable for rated input voltages.
- 3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- 4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Continuous level measurement - Radar transmitters

# SITRANS LR250 threaded PVDF Specials

# Selection and ordering data

SITRANS LR250 threaded PVDF Specials	
	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)	
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588171
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588253
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E03588512
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E03589260
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E03589262
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E03589264
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589266
LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589275
LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E03589277
LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E03589280
LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E03589281
LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E03589283

	Article No.
	ALLICIE INO.
SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03569747
LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03586807
LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03586854
LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E03586887
LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E03586961
LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E03587012
LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E03587132
LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E03587223
LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03588125
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	A5E03528941
Antenna kit 2" R (BSPT) threaded PVDF	A5E03528943
Antenna kit 2" G (BSPP) threaded PVDF	A5E03528947
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher and loctite	A5E03528948

#### Continuous level measurement - Radar transmitters

### SITRANS LR250 Flanged Encapsulated Antenna

### Overview



SITRANS LR250 with flanged encapsulated antenna is a 2-wire. 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

### Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- · Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMŠ, or Field Device Tools, such as PACTware or Fieldcare via
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

#### Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to ob-

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

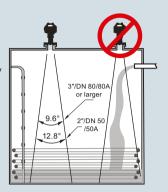
Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required, such as food or fine chemicals.

### Configuration

#### Installation

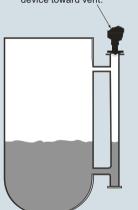
#### Note:

- · Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected



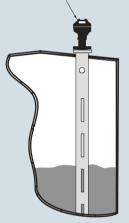
#### Mounting unit on bypass

Orient front or back of device toward vent.

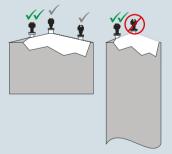


# Mounting unit on stilling well

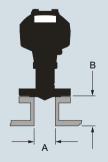
Orient front or back of device toward stillpipe slots.



#### Mounting unit on vessel



Mounting on a nozzle



Α	B*
Ø50 (2)	500 (20) max.
Ø80 (3)	500 (20) max.
	500 (20) max.
Ø150 (6)	500 (20) max.
*D-f	1747

SITRANS LR250 flanged encapsulated antenna installation, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna

# Technical specifications

Mode of operation		Process connections
Measuring principle	Radar level measurement	Flanged connection
Frequency	K-band (25.0 GHz)	
Minimum measuring range	50 mm (2 inch) from end of antenna	
Maximum measuring range	20 m (66 ft)	
Output		
HART	Version 5.1	Power supply
Analog output	4 20 mA	4 20 mA/HART
Accuracy     Fail-safe	<ul><li>± 0.02 mA</li><li>Programmable as high low or hold (loss of echo)</li><li>NE 43 programmable</li></ul>	PROFIBUS PA FOUNDATION Fieldbus
PROFIBUS PA	Profile 3.01	1 OUNDATION FIEldbus
<ul> <li>Function blocks</li> </ul>	2 Analog Input (AI)	Certificates and approval
FOUNDATION Fieldbus	H1	General
Functionality	Basic or LAS	Radio
<ul><li>Version</li><li>Function blocks</li></ul>	ITK 5.2.0 2 Analog Input (AI)	
Performance (according to		Hazardous
reference conditions IEC60770-1)		<ul> <li>Explosion Proof (Brazil)</li> </ul>
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch)	• Increased Safety (Brazil
	<ul> <li>&lt; 500 mm from sensor reference point: 25 mm (1 inch)</li> </ul>	Intrinsically Safe (Brazil)
Influence of ambient temperature	< 0.003 %/K	<ul> <li>Explosion Proof (Canada</li> </ul>
Rated operating conditions		
Installation conditions  • Location	Indoor/outdoor	Intrinsically Safe (Canada
Ambient conditions (enclosure)		Non-incendive (Canada/
Ambient temperature	-40 +80 °C (-40 +176 °F)	- Fl D
<ul><li>Installation category</li><li>Pollution degree</li></ul>	4	<ul> <li>Flame Proof/Increased Sa (China)</li> </ul>
Medium conditions	4	, ,
	> 1.6 (antanna danandant)	Intrinsically Safe (China)
Dielectric constant ε <sub>r</sub>	≥ 1.6 (antenna dependent)	Non-sparking/Energy Lin
Process temperature	-40 +170 °C (-40 +338 °F) at process connection	(China) • Intrinsically Safe (Europe
Process pressure	See Pressure/Temperature curves for more information (page 4/237)	<ul> <li>Non-sparking/Energy Lin (Europe)</li> </ul>
Design		Flame Proof (International
Enclosure     Material	Aluminum, polyester powder-coated	•
Cable inlet	2 x M20x1.5 or 2 x ½" NPT	Increased Safety
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	(International/Europe)
Weight (dependent on process con- nection)	Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size)     Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size)	<ul> <li>Intrinsically Safe (Internal</li> <li>Explosion Proof (Russia)</li> <li>Increased Safety (Russia)</li> <li>Intrinsically Safe (Russia)</li> </ul>
Display (local)	Graphic local user interface including quick start wizard and echo profile display	Marine
Antenna		<ul> <li>Functional Safety</li> </ul>
Material     Dimensions (nominal sizes)	Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part) 48 mm (2 inch), 80 mm (3 inch),	
- Dimensions (nonlinal sizes)	100 mm (4 inch), 150 mm (6 inch)	

Process connections	
Flanged connection	Raised Face
rianged connection	
	<ul><li>2, 3, 4, 6" Class 150 ASME B16.5</li><li>50A, 80A, 100A, 150A 10K</li></ul>
	JIS B 2220
	• DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1
Power supply	
4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 $\Omega$
PROFIBUS PA	<ul><li>15 mA</li><li>Per IEC 61158-2</li></ul>
FOUNDATION Fieldbus	<ul><li>20.0 mA</li><li>Per IEC 61158-2</li></ul>
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C
Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C
<ul> <li>Non-sparking/Energy Limited (China)</li> </ul>	NEPSI Ex nA IIC T4 Gc
Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIIC T100 °C Da
<ul> <li>Non-sparking/Energy Limited (Europe)</li> </ul>	ATEX II 3G Ex nA IIC T4 Gc
Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Intrinsically Safe (International)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
• Explosion Proof (Russia)	GOST-R Ex d
Increased Safety (Russia)	GOST-R Ex e
Intrinsically Safe (Russia)	GOST-R Ex ia
Marine	<ul><li>Lloyd's Register of Shipping</li><li>ABS Type Approval</li><li>Bureau Veritas</li></ul>
Functional Safety	SIL-2 suitable in accordance with

SIL-2 suitable in accordance with IEC 61508/61511

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna

Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul> <li>Approvals for handheld-programmer</li> </ul>	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C Ta = -20 +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 $T_a = 50$ °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM     Emerson AMS     SITRANS DTM     (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays
	αιοριαγο

SITRANS LR250 Flanged Encaps	ule	ateu	Αn	iter	IIIe
Selection and Ordering data	Α	rticle	No.		_
SITRANS LR250 flanged encapsulated antenna	_	ML54			
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependant). Ideal for corrosive, aggressive and low dielectric media.	•	•••	0 -		1
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.					
Process Connection Material Stainless steel 1.4404/1.4435	0				
Process Connection Type Flanged Process Connection Types (stainless steel 1.4404/1.4435)  2" Class 150 ASME B16.5 raised face 1) 3" Class 150 ASME B16.5 raised face 4" Class 150 ASME B16.5 raised face 6" Class 150 ASME B16.5 raised face 6" Class 150 ASME B16.5 raised face 50A 10K JIS B 2220 raised face 100A 10K JIS B 2220 raised face 10D 50 PN 10/16 EN 1092-1 type B1 raised face 10D 100 PN 10/16 EN 1092-1 type B1 raised face 10D 100 PN 10/16 EN 1092-1 type B1 raised face 10D 100 PN 10/16 EN 1092-1 type B1 raised face 10D 100 PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 1092-1 type B1 raised face 10D 10D PN 10/16 EN 10D PN 10		BF BBJ FF FF GB GC			
DN 150 PN 10/16 EN 1092-1 type B1 raised face  Communication/Output		G D			
PROFIBUS PA 4 20 mA, HART, start-up at < 3.6 mA FOUNDATION Fieldbus	1	1 2 3			
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT 2 x M20x1.5				0	
Antenna lens material					
TFM 1600 PTFE Flush Lens				Α	
Approvals					
General Purpose, CE, CSA, FM, FCC, R&TTE,	1				A
RCM Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A,  B, C, D, Class II, Div.1, Groups E, F, G, Class III T4 FCC, Industry Canada				١	В
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM				(	С
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B,  C, D T5, FCC, Industry Canada				ı	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	1			1	E
Increased Safety: IECEx/ATEX II 1/2 GD,1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>2</sup> )				I	F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>2)</sup>				(	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada <sup>2)</sup> Non Sparking: NEPSI Ex nA IIC T4 Gc					H K
Intrinsically Safe: NEPSI Ex ia IIC T4 Gc					L
Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C					
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IPG7 DIP A20 T <sub>A</sub> 90 °C <sup>2</sup> Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IPG7 DIP A20 T <sub>A</sub> 90 °C <sup>2</sup>					M N
Pressure rating					
Rating per Pressure/Temperature curves in instruction manual					0

 $<sup>^{1)}</sup>$  Maximum range 10 m (32.8 ft), dk > 3 [20 m (66 ft)] and dk > 1.6 when mounted in stillpipe]

 $<sup>^{2)}\,</sup>$  Applicable with communication option 2 only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

### Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna

Simano En230 i langea Encapsulatea Al	noma
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating Connector <sup>1)2)3)</sup>	A50
Plug 7/8" with mating Connector <sup>2)3)4)</sup>	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ● Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 <sup>5)6)</sup> Namur NE43 compliant, device preset to failsafe  < 3.6 mA <sup>5)</sup>	C20 N07
Operating Instructions for HART/mA device	Article No.
English	A5E32220602
German	A5E32376088
French	A5E35108592
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for HART/mA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171
English, Portuguese (Brazil), Chinese	A5E34046583
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Operating Instructions for PROFIBUS PA device	
English	A5E32221386
German	A5E32376094
French	A5E35108597
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for PROFIBUS PA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685
English, Portuguese (Brazil), Chinese	A5E34046624
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	

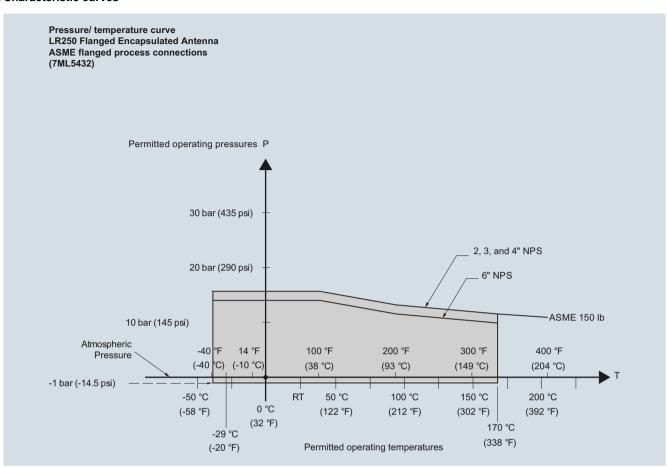
Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	A5E32221411
German	A5E32376112
French	A5E35108601
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
English, Portuguese (Brazil), Chinese	A5E34046626
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART (2 are required) <sup>6)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (2 are required) <sup>2)</sup>	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

- 1) Available with enclosure option 1 only
- 2) Available with communication options 1 and 3 only
- $^{\rm 3)}$  Available with approval options A, B, C, and L only
- 4) Available with enclosure option 0 only
- 5) Applicable with communication option 2 only
- $^{6)}\,$  Available with approval options A, B, C, D, E, K, and L only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna

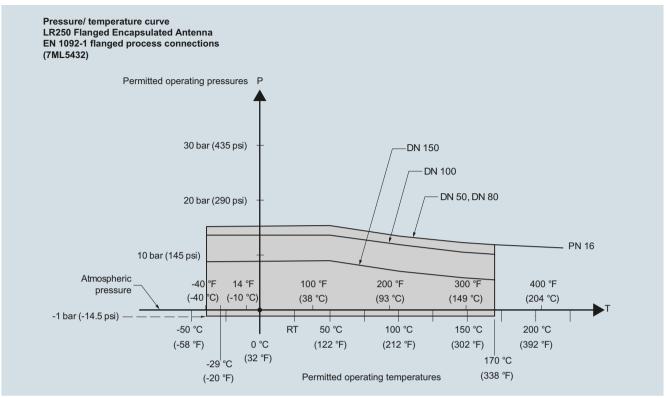
# Characteristic curves



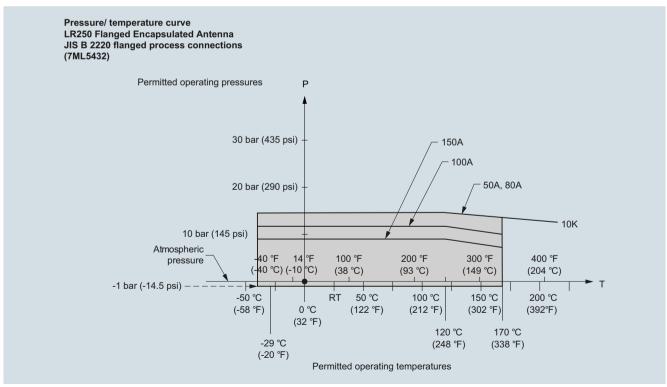
SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

### Continuous level measurement - Radar transmitters

### **SITRANS LR250 Flanged Encapsulated Antenna**



SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

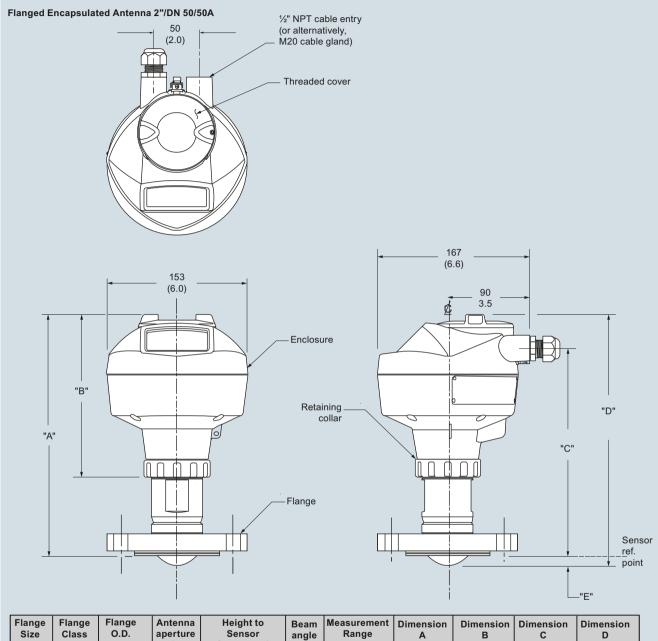


SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna

# Dimensional drawings



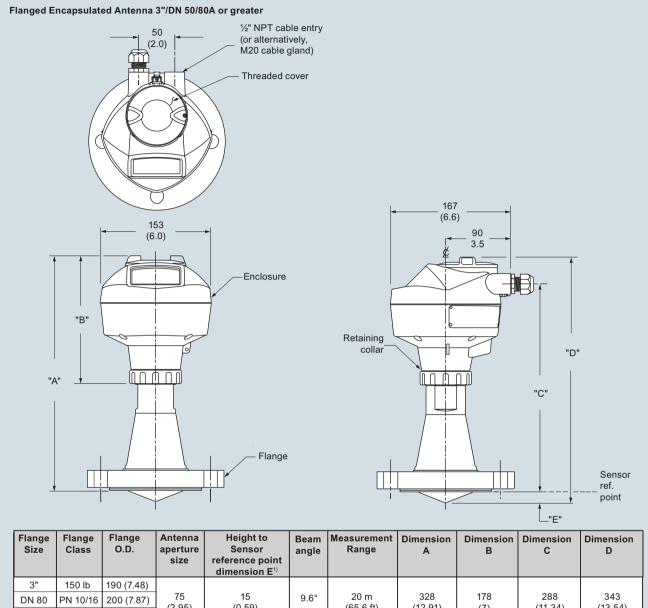
Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E <sup>1)</sup>	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
2"	150 lb	152 (5.98)								
DN 50	PN 10/16	165 (6.50)	50	11	12.8°	10 m	263	178	223	274
50A	10K	155 (6.10)	(1.97)	(0.43)		(32.8 ft)	(10.35)	(7)	(8.78)	(10.79)

 $<sup>^{\</sup>mbox{\tiny 1)}}$  Height from tip of lens to sensor reference point as shown.

SITRANS LR250 flanged encapsulated antenna, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Antenna



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E <sup>1)</sup>	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D	
3"	150 lb	190 (7.48)									
DN 80	PN 10/16	200 (7.87)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343	
80A	10K	185 (7.28)								(13.54)	
4"	150 lb	230 (9.06)	75 (2.95)								
DN 100	PN 10/16	220 (8.66)		13 (0.51)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343	
100A	10K	210 (8.27)								(13.50)	
6"	150 lb	280 (11.02)	75 (2.95)								
DN 150	PN 10/16	285 (11.25)		15	9.6°	20 m	333 (13.11)	178	293	348 (13.70)	
150A	10K	280 (11.02)		(0.59)		(65.6 ft)	(10.11)	(7)	(11.54)	(13.70)	

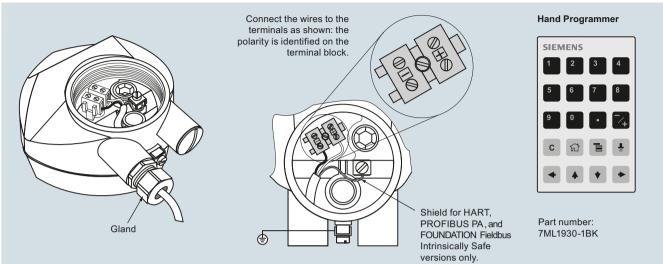
 $<sup>^{\</sup>mbox{\tiny 1)}}$  Height from tip of lens to sensor reference point as shown.

SITRANS LR250 flanged encapsulated antenna, dimensions in mm (inch)

#### Continuous level measurement - Radar transmitters

## SITRANS LR250 Flanged Encapsulated Antenna

# Schematics



#### Notes:

- 1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
- 2. All field wiring must have insulation suitable for rated input voltages.
- 3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- 4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Continuous level measurement - Radar transmitters

# SITRANS LR250 Flanged Encapsulated Specials

## Selection and ordering data

Selection and ordering data	
SITRANS LR250 flanged encapsulated Specials	
	Article No.
SITRANS LR250 flanged encapsulated antenna	
version enclosures (PROFIBUS PA models)	
LR250 flanged encapsulated antenna version	A5E32462853
(7ML5432) enclosure with board stack, M20 cable	A3L32402033
inlet, approval option A, with PROFIBUS PA communication, no process connection	
LR250 flanged encapsulated antenna version	A5E32462854
(7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA	
communication, no process connection	
LR250 flanged encapsulated antenna version	A5E32462855
(7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA	
communication, no process connection	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable	A5E32462856
inlet, approval option C, with PROFIBUS PA	
communication, no process connection	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable	A5E32462857
inlet, approval option D, with PROFIBUS PA	
communication, no process connection	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable	A5E32462858
inlet, approval option E, with PROFIBUS PA	
communication, no process connection	
SITRANS LR250 flanged encapsulated antenna version enclosures	
(FOUNDATION Fieldbus models)	
LR250 flanged encapsulated antenna version	A5E32462859
(7ML5432) enclosure with board stack, M20 cable inlet, approval option A,	
with FOUNDATION Fieldbus communication,	
no process connection  LR250 flanged encapsulated antenna version	
(7ML5432) enclosure with board stack,	A5E32462860
NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication,	
no process connection	
LR250 flanged encapsulated antenna version	A5E32462861
(7ML5432) enclosure with board stack, NPT cable inlet, approval option B,	
with FOUNDATION Fieldbus communication,	
no process connection	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack,	A5E32462862
M20 cable inlet, approval option C,	
with FOUNDATION Fieldbus communication, no process connection	
LR250 flanged encapsulated antenna version	A5E32462863
(7ML5432) enclosure with board stack, NPT cable inlet, approval option D,	A3L32402003
with FOUNDATION Fieldbus communication,	
no process connection	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack,	A5E32462864
M20 cable inlet, approval option E,	
with FOUNDATION Fieldbus communication, no process connection	
SITRANS LR250 flanged encapsulated	
antenna version enclosures	
(< 3.6 mA start-up HART models)	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack,	A5E32462865
M20 cable inlet, approval option A,	
with HART communication start-up at < 3.6 mA, no process connection	
LR250 flanged encapsulated antenna version	A5E32462866
(7ML5432) enclosure with board stack,	. 10202702000
NPT cable inlet, approval option A, with HART communication start-up	
at < 3.6 mA, no process connection	

	Article No.
_R250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E32462867
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E32462868
.R250 flanged encapsulated antenna version 7ML5432) enclosure with board stack, IPT cable inlet, approval option D, vith HART communication start-up tt < 3.6 mA, no process connection	A5E32462869
R250 flanged encapsulated antenna version 7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up tt < 3.6 mA, no process connection	A5E32462830
LR250 flanged encapsulated antenna version 7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E32462831
.R250 flanged encapsulated antenna version 7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E32462832
LR250 flanged encapsulated antenna version 7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E32462833
SITRANS LR250 flanged encapsulated antenna lens kits	
Replacement TFM 1600 Lens and Spring Washer Kit for 2" Class 150 ASME B16.5 raised face	A5E32462817
Replacement TFM 1600 Lens and Spring Washer Kit for 3" Class 150 ASME B16.5 raised face Replacement TFM 1600 Lens and Spring Washer	A5E32462819
Kit for 4" Class 150 ASME B16.5 raised face Replacement TFM 1600 Lens and Spring Washer	A5E32462820
Kit for 6" Class 150 ASME B16.5 raised face Replacement TFM 1600 Lens and Spring Washer	A5E32462821 A5E32462822
Kit for 50A 10K JIS B 2220 raised face Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised face	A5E32462823
Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised face	A5E32462824
Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised face	A5E32462825
Replacement TFM 1600 Lens and Spring Washer Kit for DN 50 PN 10/16 EN 1092-1 type B1 raised ace	A5E32462826
Replacement TFM 1600 Lens and Spring Washer Kit for DN 80 PN 10/16 EN 1092-1 type B1 raised ace	A5E32462827
Replacement TFM 1600 Lens and Spring Washer Kit for DN 100 PN 10/16 EN 1092-1 type B1 raised ace	A5E32462828
Replacement TFM 1600 Lens and Spring Washer Kit for DN 150 PN 10/16 EN 1092-1 type B1 raised	A5E32462829

at < 3.6 mA, no process connection

#### Continuous level measurement - Radar transmitters

#### SITRANS LR250 Hygienic Encapsulated Antenna

#### Overview



The SITRANS LR250 hygienic encapsulated antenna is a 2 wire 25GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries and pastes within the Food, Beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) - antenna dependent. (Pictures shown with accessories - sold separately)

#### Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens.
- < 0.8 μ Ra surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3 and Tuchenhagen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

## Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Start-up is easy using the Quick Start wizard with few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

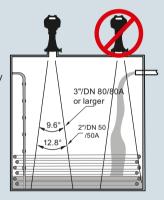
 Key Applications: applications within the Food, Beverage, Chemical and Pharmaceutical industries where sanitary, aseptic or hygienic approvals are required or easy install/ clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer and pharmaceutical or chemical additives and ingredients.

## Configuration

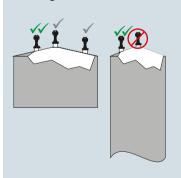
#### Installation

#### Note:

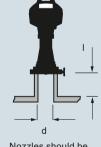
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



#### Mounting unit on vessel



## Mounting on a nozzle



Nozzles should be maximum I/d ratio 1:1 (Eg. 50 mm length, 50 mm diameter)

# Continuous level measurement - Radar transmitters

# SITRANS LR250 Hygienic Encapsulated Antenna

# Technical specifications

Mode of Operation		Process connections	
Measuring principle	Radar level measurement	Hygienic/Sanitary connections	• 2", 3" & 4" Sanitary Clamp according
Frequency	K-band (25.0 GHz)		to ISO 2852 • DN 50, DN 80 & DN 100 Aseptic/
Minimum measuring range	50 mm (2 inch) from end of antenna		Hygienic threaded to DIN 11864-1
Maximum measuring range	20 m (66 ft)		[Form A] • DN 50, DN 80 & DN 100 Aseptic/
Output			Hygienic flanged to DIN 11864-2
HART	Version 5.1		[Form A] • DN 50, DN 80 & DN 100 Aseptic/
<ul> <li>Analog output</li> </ul>	4 20 mA		Hygienic Clamp according to
Accuracy	± 0.02 mA		DIN 11864-3 [Form A] • DN 50, DN 80 & DN 100 Hygienic
• Fail-safe	<ul><li>Programmable as high low or hold (loss of echo)</li><li>NE 43 programmable</li></ul>		Union according to DIN 11851  Type F (50 mm) & Type N (68 mm) Tuchenhagen Varivent
PROFIBUS PA	Profile 3.01	Power supply	
<ul> <li>Function blocks</li> </ul>	2 Analog Input (AI)	4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with
FOUNDATION Fieldbus	H1	1 20 110 VI V VI V	max. 550 $\Omega$
• Functionality	Basic or LAS	PROFIBUS PA	• 15 mA
<ul><li>Version</li><li>Function blocks</li></ul>	ITK 5.2.0 2 Analog Input (AI)		• Per IEC 61158-2
Performance (according to refer-	2 Arialog Iriput (Al)	FOUNDATION Fieldbus	<ul><li>20.0 mA</li><li>Per IEC 61158-2</li></ul>
ence conditions IEC60770-1)		Certificates and approvals	F ELLO 01130-2
Maximum measured error	• > 500 mm from sensor reference	General	CSA CE EM NE 21 DCM
	point: 3 mm (0.118 inch) • < 500 mm from sensor reference		CSA <sub>US/C</sub> , CE, FM, NE 21, RCM
	point: 25 mm (1 inch)	Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
nfluence of ambient temperature	< 0.003 %/K	Hazardous	
Rated operating conditions		<ul> <li>Explosion Proof (Brazil)</li> </ul>	INMETRO Ex d ia mb IIC T4 Ga/Gb,
Installation conditions  Location	Indoor/outdoor	• Increased Safety (Brazil)	Ex ia ta IIIC T100 °C Da INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Ambient conditions (enclosure)		Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta
Ambient temperature	-40 +80 °C (-40 +176 °F)	5 1 : D ((O 1 //10A)	IIIC T100 °C Da
Installation category	ļ.	<ul> <li>Explosion Proof (Canada/USA)</li> </ul>	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1,
Pollution degree	4		Groups E, F, G; Class III T4
Medium conditions		Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1,
Dielectric constant ε <sub>r</sub>	≥ 1.6 (antenna dependent)		Groups E, F, G; Class III T4
Process temperature	-40 +170 °C (-40 +338 °F) at process connection	Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Dragge program	See Pressure/Temperature curves for	Flame Proof/Increased Safety	NEPSI Ex d ia mb IIC T4 Ga/Gb,
Process pressure	more information	(China)	Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 $T_A$ 90 °C
Design		<ul> <li>Intrinsically Safe (China)</li> </ul>	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T₄90 °C
Enclosure • Material	Aluminum, polyester powder coated	<ul> <li>Non-sparking (China)</li> </ul>	NEPSI Ex nA IIC T4 Gc
Cable inlet	2 x M20x1.5 or 2 x ½" NPT	<ul> <li>Intrinsically Safe (Europe)</li> </ul>	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1E Ex ia ta IIIC T100 °C Da
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	<ul><li>Non-sparking (Europe)</li><li>Flame Proof (International/Europe)</li></ul>	ATEX II 3G Ex nA IIC T4 Gc
Weight (dependent on process	• Approx. 4.7 kg (10.4 lb) for	- Harrie Froor (international/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb,
connection)	2" ISO 2852 (smallest size)		Ex ia ta IIC T100 °C Da
	<ul> <li>Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size)</li> </ul>	<ul> <li>Increased Safety (International/Europe)</li> </ul>	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb,
Display (local)	Graphic local user interface including	. ,	Ex ia ta IIIC T100 °C Da
Display (local)	quick start wizard and echo profile display	Intrinsically Safe (International)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
Antenna		Explosion Proof (Russia)	GOST-R Ex d
Material	Stainless steel 316L (1.4435 or	Increased Safety (Russia)	GOST-R Ex e
	1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)	<ul> <li>Intrinsically Safe (Russia)</li> </ul>	GOST-R Ex ia
• Lens surface finish (R <sub>a</sub> )	0.8 μm	Hygienic/Sanitary	EHEDG EL Class I
			EHEDG EL Aseptic Class I

Continuous level measurement - Radar transmitters

Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul> <li>Approvals for handheld programmer</li> </ul>	IS model:
	ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C Ta = -20 +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 $T_a = 50$ °C IECEX SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM     Emerson AMS     SITRANS DTM     (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

## Continuous level measurement - Radar transmitters

Selection and Ordering data  Article No.					
SITRANS LR250 hygienic encapsulated antenna			433-		
2-wire, 25 Ghz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.		••	0 -	A	i
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Hygienic/Sanitary Approvals					
EHEDG EL Class I <sup>1)</sup> EHEDG EL Aseptic Class I <sup>1)</sup> 3-A (Tuchenhagen connections only - FC FF) <sup>2)3)</sup> EHEDG EL Class I & 3-A (excludes Tuchenhagen connections) <sup>2)4)</sup>	1 2 3 4				
Process Connection Types (all types have TFM1600 PTFE lens)					
316L st/st [1.4435 or 1.4404]					
2" Sanitary Clamp according to ISO 2852 <sup>5)</sup> 3" Sanitary Clamp according to ISO 2852 4" Sanitary Clamp according to ISO 2852		A A A B A C			
316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301) DN 50 Aseptic/Hygienic nozzle/ slotted nut		ВА			
(instrument side) to DIN 11864-1 [Form A] <sup>5)</sup> DN 80 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]		ВВ			
DN 100 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]		вс			
316L st/st [1.4435 or 1.4404] DN 50 Aseptic/Hygienic flanged to DIN 11864-2		CA			
[Form A] <sup>5)</sup> DN 80 Aseptic/Hygienic flanged to DIN 11864-2		СВ			
[Form A]  DN 100 Aseptic/Hygienic flanged to DIN 11864-2		СС			
[Form A] 316L st/st [1.4435 or 1.4404]					
DN 50 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] <sup>5)</sup>		DΑ			
DN 80 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]		DB			
DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]		DC			
316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)  DN 50 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851 <sup>5)</sup>		ΕA			
DN 80 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851		ΕВ			
DN 100 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851		EC			
316L st/st [1.4435 or 1.4404] Type F (50 mm) Tuchenhagen Varivent (EHEDG only) <sup>5)</sup>		FΑ			
Type N (68 mm) Tuchenhagen Varivent (EHEDG only) <sup>5)</sup>		FΒ			
Type F (50 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 120 °C (-40 248 °F )] <sup>5)</sup>		FC			
Type N (68 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 120 °C (-40 248 °F)] <sup>5)</sup>		FD			
Type F (50 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 170 °C (-4 338 °F)] <sup>5)</sup>		FΕ			
Type N (68 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 170 °C (-4 338 °F)] <sup>5)</sup>		FF			
EXCLUDE Process Connection - Electronics Head assembly spare only (select all other options as normal)		ΥY			

Selection and Ordering data	Aı	rticle	e N	lo.		
SITRANS LR250 hygienic encapsulated antenna	71	ML5	433	3-		
2-wire, 25 Ghz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.	-	••	0	-	Α	
Communication						
PROFIBUS PA	,		1			
4 20 mA HART, start-up at < 3.6 mA	,	:	2			
FOUNDATION Fieldbus	,	;	3			
Enclosure (with Cable Inlets)						
Aluminum, Epoxy paint, 2 X ½" NPT	,			C	)	
Aluminum, Epoxy paint, 2 X M20 x 1.5	,			1		
Approvals						
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM●	,				1	Δ
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada						В
Intrinsically Safe: IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM					(	С
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada					ı	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM					1	E
Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>6)</sup>						F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM <sup>6)</sup>					(	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada <sup>6)</sup>					ı	Н
Non Sparking: NEPSI Ex nA IIC T4 Gc					ı	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 TA 90 °C					ı	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 TA 90 $^{\circ}$ C <sup>6)</sup>					ı	V
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, $\P$ Ex iaD 20 T90 IP67 DIP A20 TA 90 $\P$ C6)					ı	N
Pressure Rating						
Rating per pressure/temperature curves in instruc- tion manual						

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Continuous level measurement - Radar transmitters

		SHRANS LR250
Selection and Ordering data	Order code	Selection and Ordering data
Further designs		Operating Instructions for FOUNDATION Fieldbus devi
Please add "-Z" to Article No. and specify Order code(s).		English
Electrical Connection cable entry:		German
Plug M12 (IP 67 rating) with mating connector <sup>2)7)8)</sup>	● A50	French
Plug 7/8" (IP 67 rating) with mating Connector <sup>2)8)9)</sup>	◆ A55	Note: The Operating Instruction red as a separate line item on
Test Certificates  Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000	• C11	Compact Operating Instruct FOUNDATION Fieldbus devi
Inspection Certificate 3.1 of EN 10204	• C12	English, French, German, Spa Danish, Finnish, Greek, Portu Swedish
Functional Safety Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 <sup>6)10)</sup>	● C20	English, Bulgarian, Czech, Es Latvian, Lithuanian, Polish, Ro Slovenian
Namur		
Namur NE43 compliant, device preset to failsafe < 3.6 mA <sup>6)</sup>	● N07	English, Portuguese (Brazil), ( This device is shipped with th
Tagging Stainless steel tag [69 mm x 50 mm		manual DVD containing the A ting Instructions and Operatin
(2.71 x 1.97 inch)] Measuring-point number / identification	• Y15	Accessories
(max. 27 characters) specify in plain text		Handheld programmer, Intrins (LUI enabled)
Operating Instructions for HART/mA device	Article No.	HART modem/USB
English	A5E32220602	(for use with a PC and SIMAT
German	A5E32376088	One metallic cable gland M20 rated -40 +80 °C (-40 +1
French	A5E35108592	rated -40 +80 °C (-40 +1 HART (two are required) <sup>6)</sup>
Note: The Operating Instructions should be ordered as a separate line item on the order.		One metallic cable gland M20 rated -40 +80 °C (-40 +1
Compact Operating Instructions for HART/mA device		and FOUNDATION Fieldbus ( SITRANS RD100, loop powers
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191	see Chapter 7 SITRANS RD200, universal in Modbus conversion - see Cha
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171	SITRANS RD300, dual line dis and linearization curve and M see Chapter 7
English, Portuguese (Brazil), Chinese	A5E34046583	SITRANS RD500 web, univers
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		solution for instrumentation - s For applicable back up point see point level measurement
Operating Instructions for PROFIBUS PA device		We can offer shorter delivery
English	A5E32221386	Quick Ship Symbol . For de
German	A5E32376094	
French	A5E35108597	1) Available with process conne
Note: The Operating Instructions should be ordered as a separate line item on the order.		<ol> <li>Available with Approval optic</li> <li>Available with Process connection</li> </ol>
Compact Operating Instructions for PROFIBUS PA device		4) Available with process conne 5) Max. range 10 m (32.8 ft), dk
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239	stillpipe] 6) Applicable with Communicat 7) Available with Enclosure opti 8) Available with Communicatio
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685	<ol> <li>Available with Communication</li> <li>Available with Enclosure option</li> <li>Available with Approval option</li> </ol>
English, Portuguese (Brazil), Chinese	A5E34046624	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		

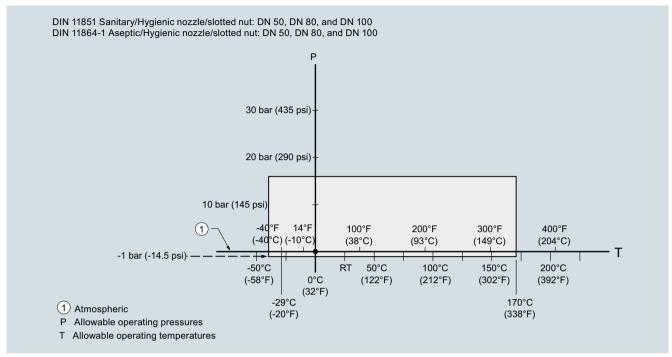
Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	A5E32221411
German	A5E32376112
French	A5E35108601
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
English, Portuguese (Brazil), Chinese	A5E34046626
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia (LUI enabled)	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART (two are required) <sup>6)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) <sup>8)</sup>	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	
We can offer shorter delivery times for configurations of	legianated with the

- ry times for configurations designated with the details see page 9/5 in the appendix.
- nection options AA ... FB & YY only
- ions A, B, C, L only
- nection FC ... FF only
- nection options AA ... EC & YY only
- lk > 3 [20 m (66 ft) and dk > 1.6 if installed in a
- ation option 2 only
- tion 1 only
- ion options 1 and 3 only.
- tion 0 only
- tions A, B, C, D, E, K, L only

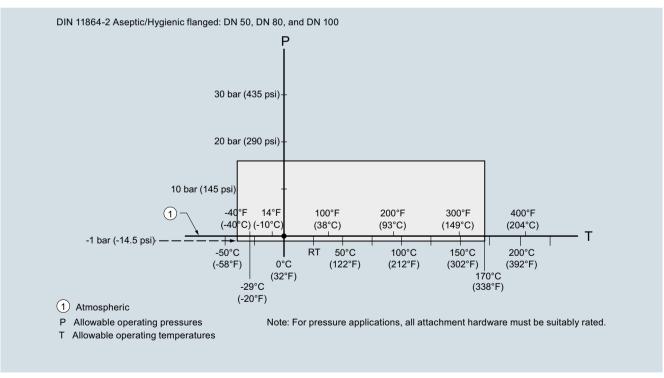
Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna

#### Characteristic curves



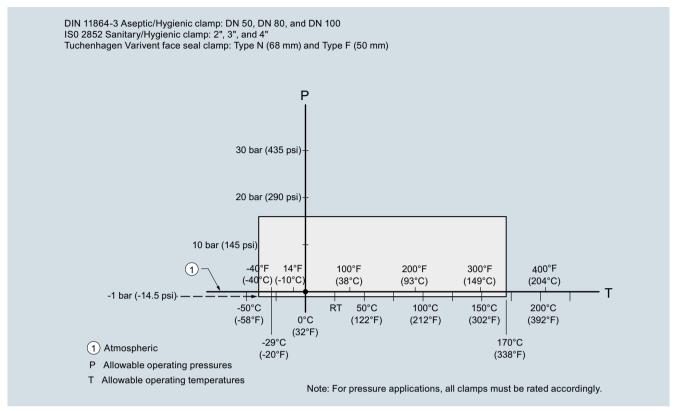
SITRANS LR250 Hygienic Encapsulated Antenna, pressure/temperature curves



SITRANS LR250, Hygienic Encapsulated Antenna, pressure/temperature curves

## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna

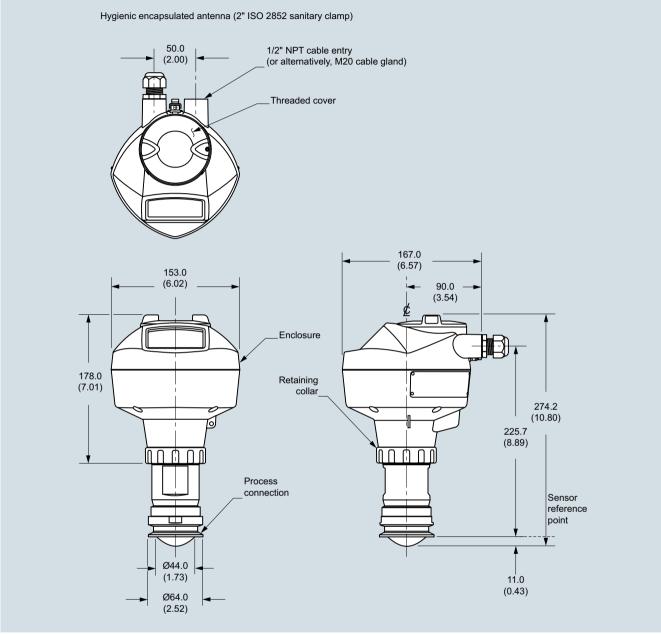


SITRANS LR250 Hygienic Encapsulated Antenna, pressure/temperature curves

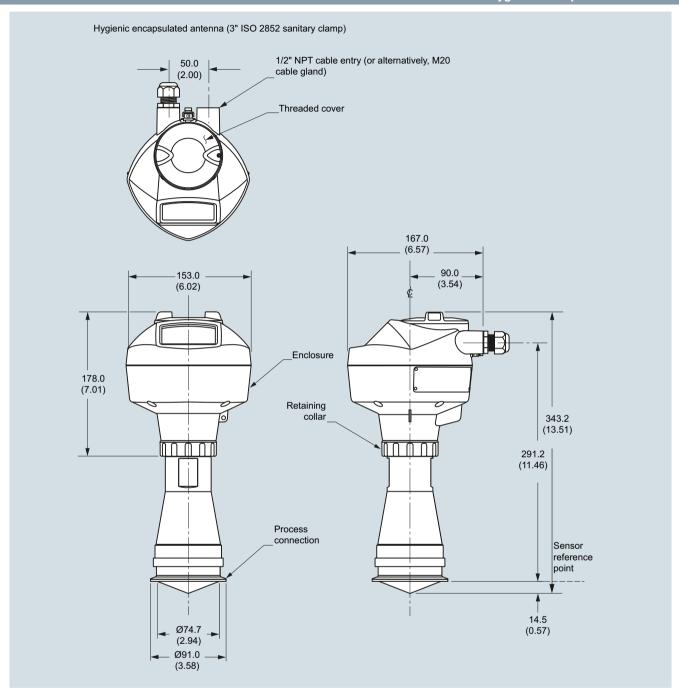
Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna

## Dimensional drawings



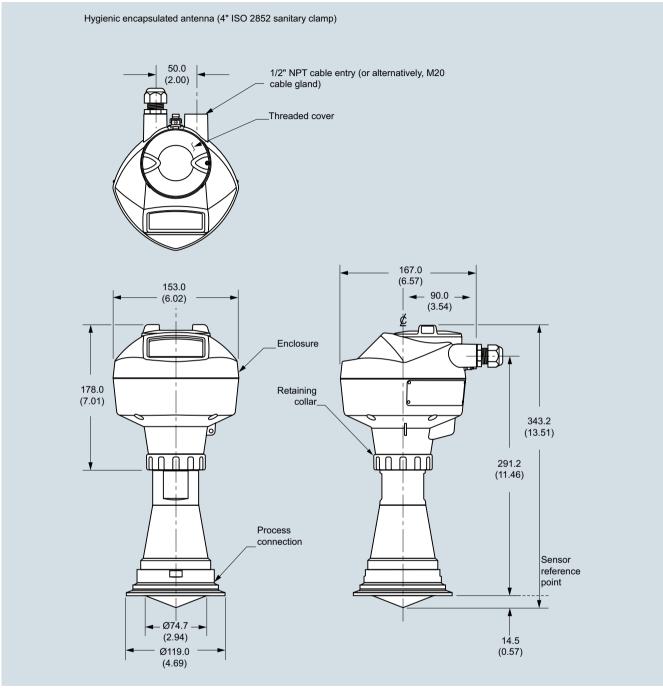
Continuous level measurement - Radar transmitters



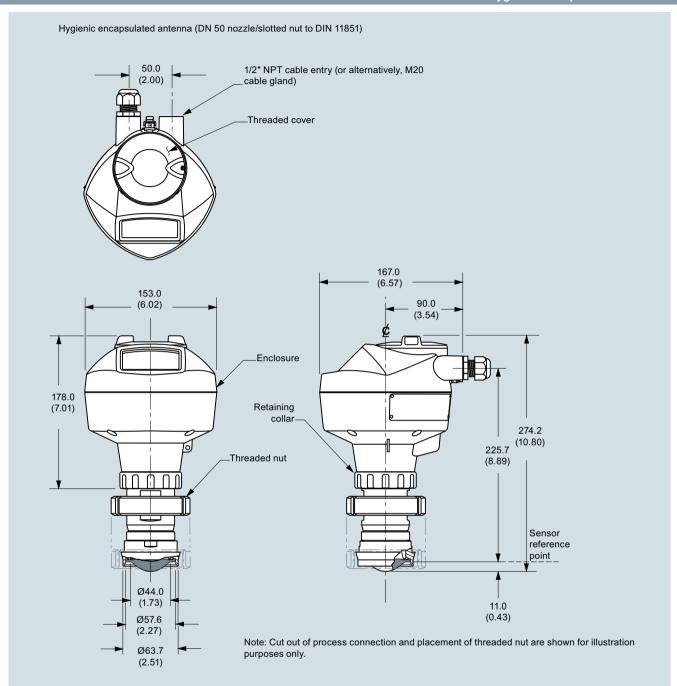
SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



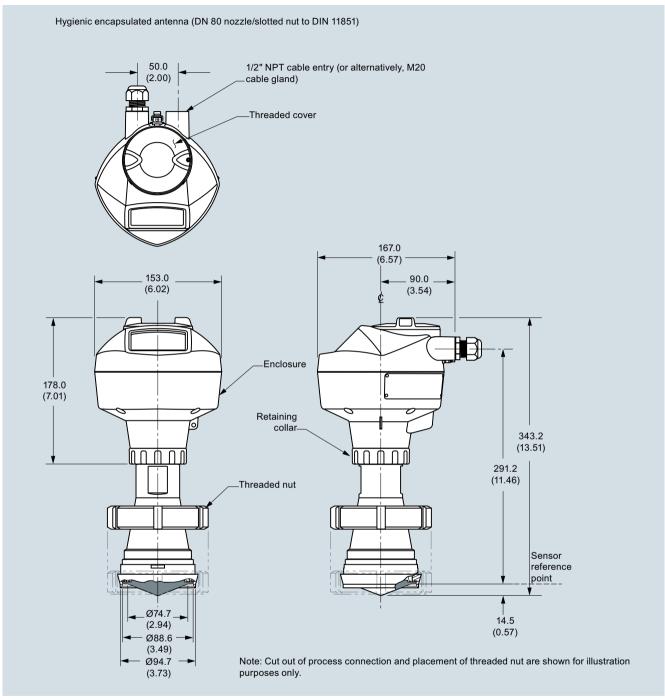
# Continuous level measurement - Radar transmitters



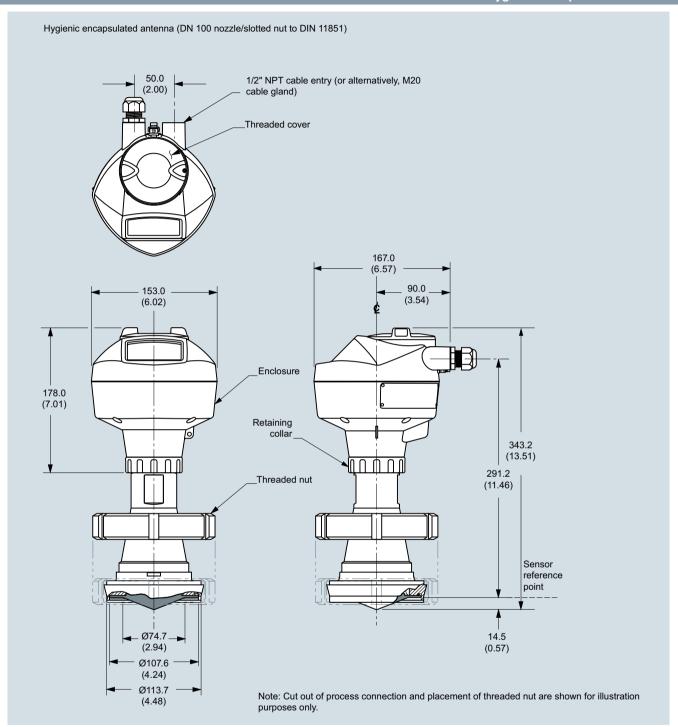
SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



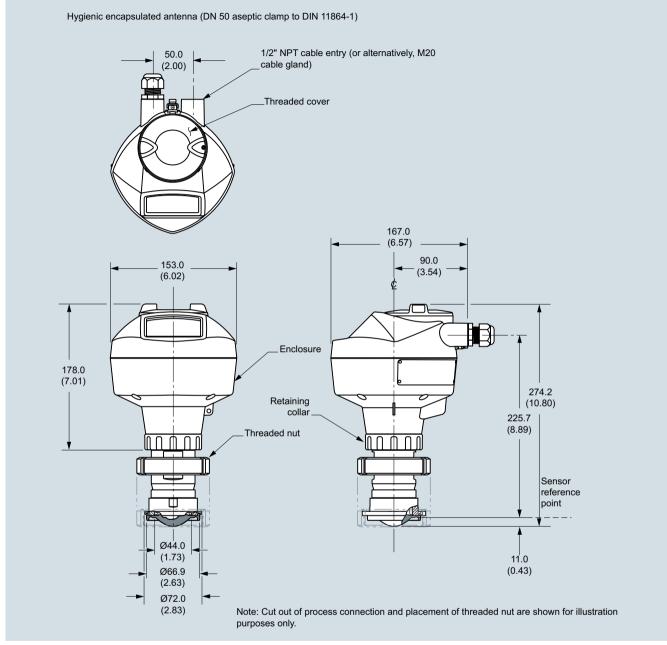
# Continuous level measurement - Radar transmitters



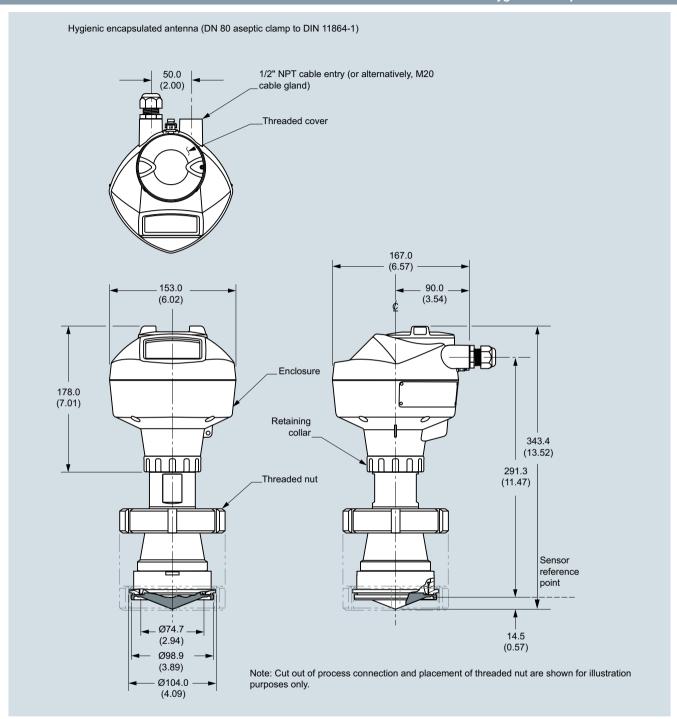
SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



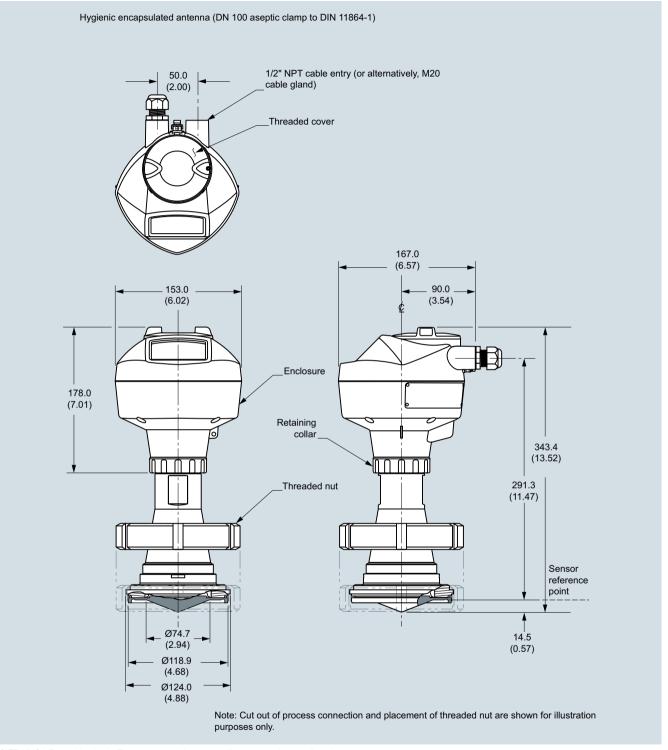
Continuous level measurement - Radar transmitters



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

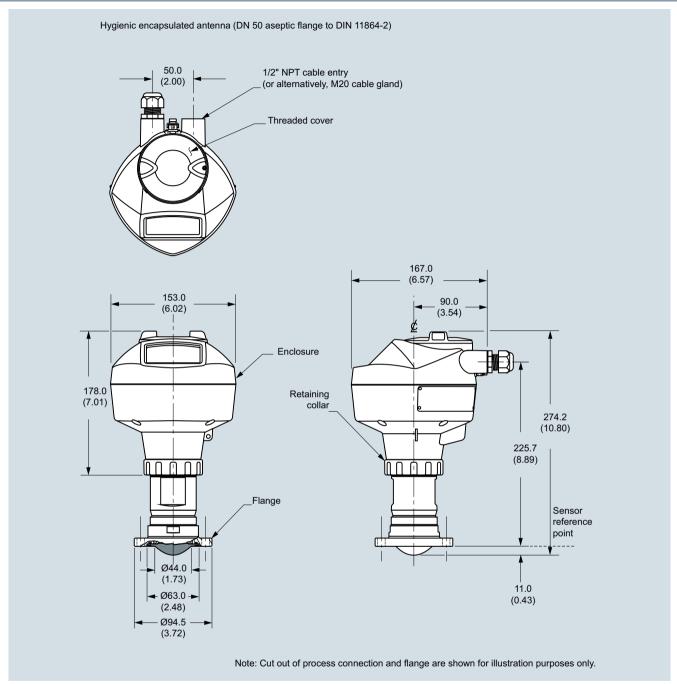
## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



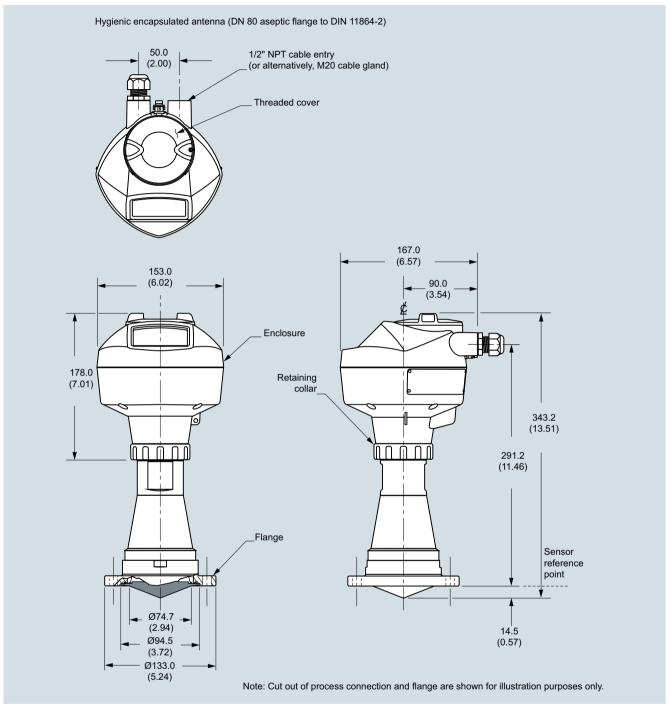
Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna

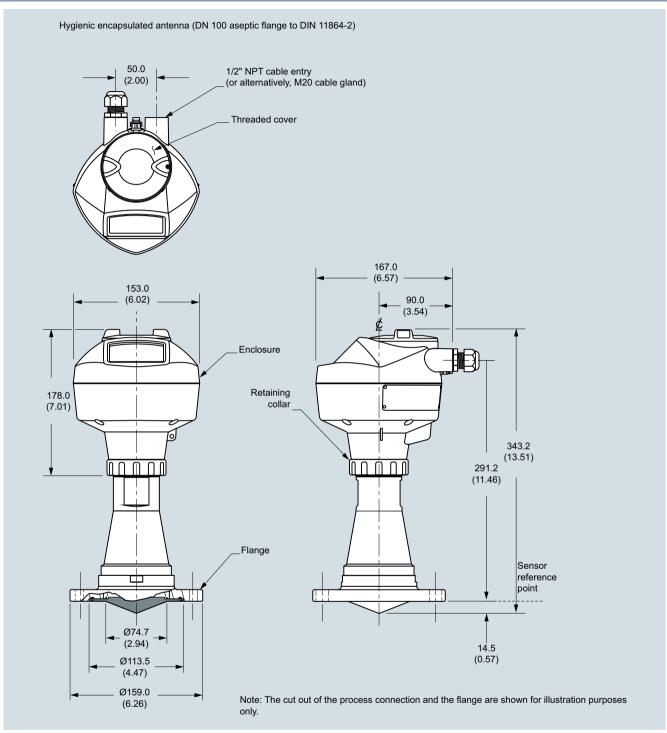


## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



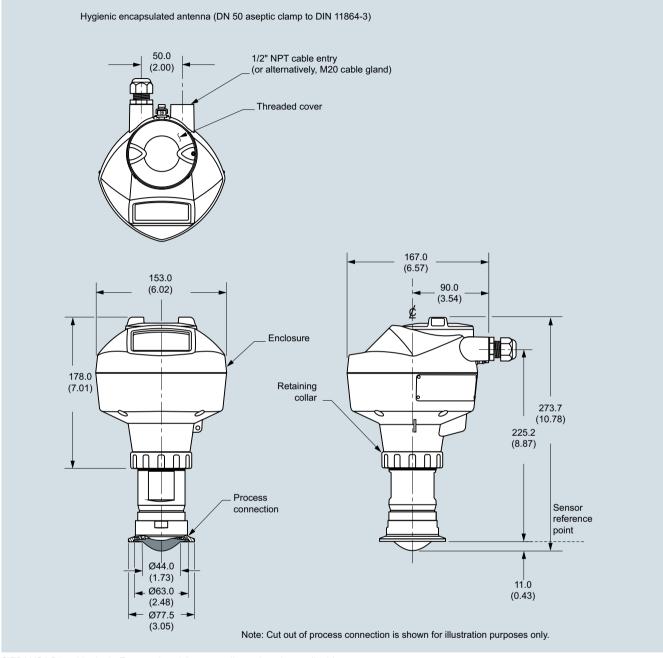
# Continuous level measurement - Radar transmitters



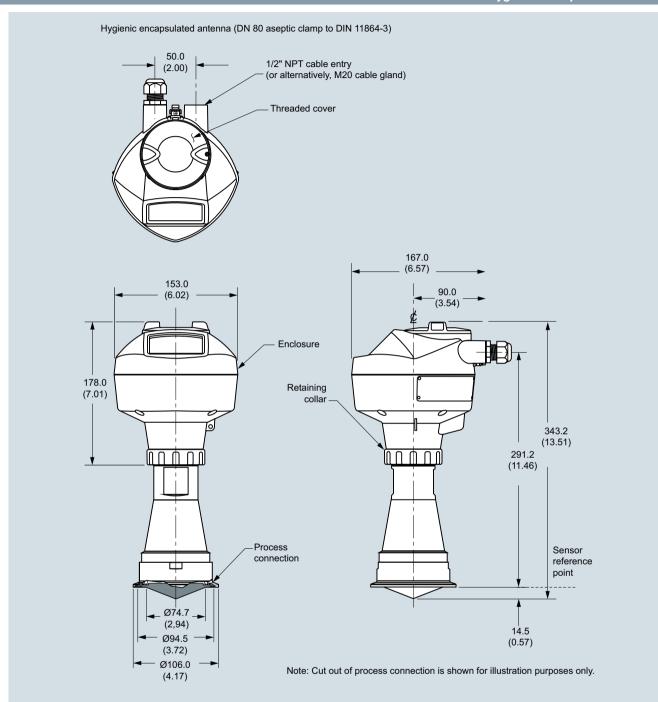
SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



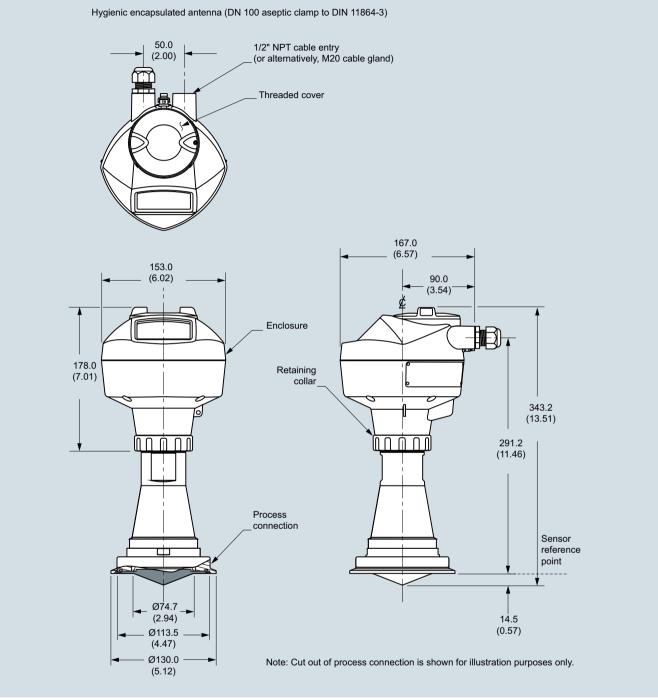
# Continuous level measurement - Radar transmitters



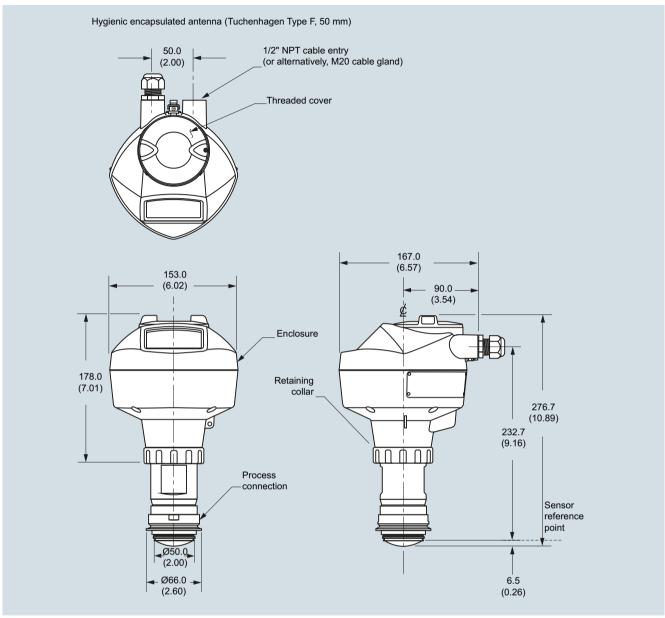
SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna



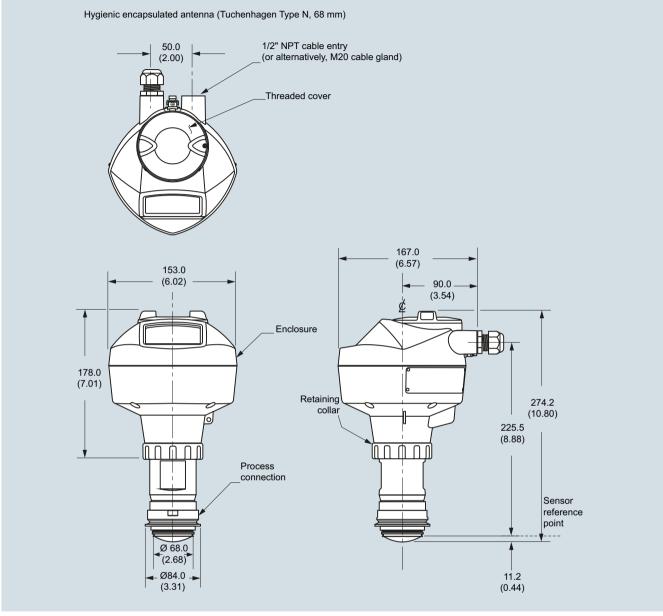
Continuous level measurement - Radar transmitters



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

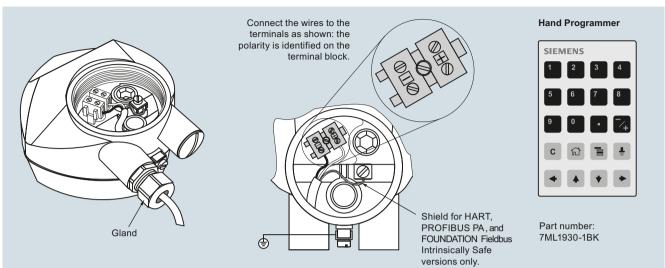
## SITRANS LR250 Hygienic Encapsulated Antenna



## Continuous level measurement - Radar transmitters

## SITRANS LR250 Hygienic Encapsulated Antenna

# Schematics



#### Notes:

- 1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
- 2. All field wiring must have insulation suitable for rated input voltages.
- 3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- 4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

#### Continuous level measurement - Radar transmitters

#### SITRANS LR250 Hygienic Encapsulated Specials

#### Selection and ordering data

SITRANS LR250	hygienic	encapsulated	Specials
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For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number.

For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following:

EHEDG EL Class 1 approval, 4 ... 20mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.



A5E32572747

A5E32572758

A5E32572770

A5E32572772

A5E32572773

A5E32572779

A5E32572782

A5E32572785

A5E32572790

A5E32572791

A5E32572794

A5E32572795

Spare Lens Kits (Lens and O-ring)

Kit, 2 inch, ISO2852, HEA, Lens, silicone secondary O-ring	A5E32572731
Kit, 3 inch, ISO2852, HEA, Lens, silicone secondary O-ring	A5E32572745

Kit, 4 inch, ISO2852, HEA, Lens, silicone secondary O-ring Kit, DN 50, DIN11851, HEA, Lens, silicone

secondary O-ring Kit, DN 80, DIN11851, HEA, Lens, silicone secondary O-ring

Kit, DN 100, DIN11851, HEA, Lens, silicone secondary O-ring

Kit, DN 50, DIN11864-1, HEA, Lens, silicone secondary O-ring
Kit, DN 80, DIN11864-1, HEA, Lens, silicone

secondary O-ring
Kit, DN 100, DIN11864-1, HEA, Lens, silicone

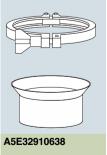
secondary O-ring
Kit, DN 50, DIN11864-2/3, HEA, Lens,

silicone secondary O-ring
Kit, DN 80, DIN11864-2/3, HEA, Lens,
silicone secondary O-ring
Kit, DN 100, DIN11864-2/3, HEA, Lens,
silicone secondary O-ring

Kit, Tuchenhagen, Type F, HEA, Lens, silicone secondary O-ring

Kit, Tuchenhagen, Type N, HEA, Lens, silicone secondary O-ring

Accessories (customer side process connection and FKM and EPDM seal for each size and type)



A5E32910649

A5E32910657

Kit DN 50 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II Kit, DN 80 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II Kit, DN 100 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II

# SITRANS LR250 hygienic encapsulated Specials Arti

	Article No.
Kit DN 50 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910658
Kit, DN 80 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910671
Kit, DN 100 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910681
Kit 2" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910686
Kit 3" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910697
Kit 4" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910708
Kit DN 50 DIN 11851 SC tank connection, EPDM Seal Class II <sup>11)</sup>	A5E32910746
Kit DN 80 DIN 11851 SC tank connection, EPDM Seal Class II <sup>11)</sup>	A5E32910771
Kit DN 100 DIN 11851 SC tank connection, EPDM Seal Class II <sup>11)</sup>	A5E32910780
Kit DN 50 DIN 11851 SC tank connection, FKM Seal Class II	A5E32910784
Kit DN 80 DIN 11851 SC tank connection, FKM Seal Class II	A5E32910789
Kit DN 100 DIN 11851 SC tank connection, FKM Seal Class II	A5E32910790
Kit DN 50 DIN 11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910791
Kit DN 80 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer),	A5E32910793
EPDM Seal Class II Kit DN 100 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910799
Kit DN 50 DIN 11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910805
Kit DN 80 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910809
Kit DN 100 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910812
Kit DN 50 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910813
Kit DN 80 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910814
Kit DN 100 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910815
Kit DN 50 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910816
Kit DN 80 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910817
Kit DN 100 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910818
Kit Type F, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489537
Kit Type N, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489543
Kit Type F, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489828
Kit Type N, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489830

<sup>&</sup>lt;sup>11)</sup> Class II for low fat applications when EPMD seal used on DIN 11851.

#### Continuous level measurement - Radar transmitters

#### **SITRANS LR260**

#### Overview



SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30 m (98.4 ft).

#### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas mounted easily in nozzles
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

#### Application

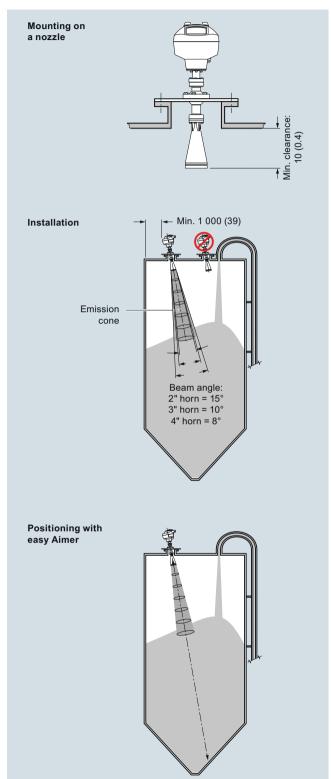
SITRANS LR260 includes a graphical local user interface (LUI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

 Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids and liquids bulk storage vessels, and other applications.

## Configuration



SITRANS LR260 installation, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

## SITRANS LR260

# Technical specifications

Mode of operation	
Measuring principle	Pulse radar level measurement
Frequency	K-band (25.0 GHz)
Minimum detectable distance	0.05 m (2 inch) from end of horn
Maximum measuring range 1)	
Solids	• 2" horn: 10 m (32.8 ft) • 3" horn: 20 m (65.6 ft) • 4" horn: 30 m (98.4 ft)
Liquids	<ul><li>2" horn: 20 m (65.6 ft)</li><li>3" horn: 30 m (98.4 ft)</li><li>4" horn: 30 m (98.4 ft)</li></ul>
Output - HART	
Power	4 20 mA (± 0.02 mA accuracy)
Fail signal	Nominal 24 V DC (max. 30 V DC)
Load	3.6 mA 23 mA; or last value 230 600 $\Omega$
Output - PROFIBUS PA	<ul><li>Per IEC 61158-2</li><li>15.0 mA</li><li>Profile version 3.01, Class B</li></ul>
Performance (according to reference conditions IEC60770-1)	
Maximum measured error (including hysteresis and non-repeatability)	25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch)     Remainder of range = 10 mm (0.39 inch) or 0.1 % of spa (whichever is greater)
Rated operating conditions	
Installation conditions • Location	Indoor/outdoor
Ambient conditions (enclosure)  • Ambient temperature  • Installation category  • Pollution degree	-40 +80 °C (-40 +176 °F) I 4
Medium conditions	
Dielectric constant $\epsilon_{\text{r}}$	$\epsilon_{\text{r}} >$ 1.6, antenna and application dependent
Process temperature	-40 +200 °C (-40 +392 °F)
Process pressure	<ul> <li>0.5 bar g (7.25 psi g) maximum</li> <li>3 bar g (43.5 psi g) optional with 80 °C (176 °F) temperature max</li> </ul>

Design	
<ul><li>Enclosure</li><li>Construction</li><li>Conduit entry</li></ul>	Aluminum, polyester powder-coated 2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Weight	< 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
Display (local)	Graphic LCD, with bar graph representing level
Flange and horn (easy aimer model)  • Material  • Horn antenna	304 stainless steel 2" horn 3" horn 4" horn
Process connections • Universal flanges <sup>2)</sup>	2 inch/50 mm, 3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm
Mechanical (Threaded Connection model)	
Threaded connection	2" NPT (ASME B1.20.1), R (BSPT, EN 10226-1) or G (BSPP, EN ISO 228-1)
Materials	316L/1.4404 or 316L/1.4435 stainless steel PTFE emitter
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, RCM
Hazardous	CSA/FM Class II, Div. 1, Groups E, F, G, Class III ATEX II 1D, 1/2D, 2D Ex ta IIIC T100 °C Da IECEX/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G SABS ARP0108 Ex ia IIC T4 Ga
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C Ta = -20 +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A,B,C,D,E,F,G, T6 Ta = 50 °C
Handheld communicator	HART communicator 375
PC	SIMATIC PDM
Display (local)	Graphic local user interface including
	quick start wizard and echo profile displays

<sup>1)</sup> From sensor reference point

Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/ JIS 2220 (10K) bolt hole pattern

## Continuous level measurement - Radar transmitters

## SITRANS LR260

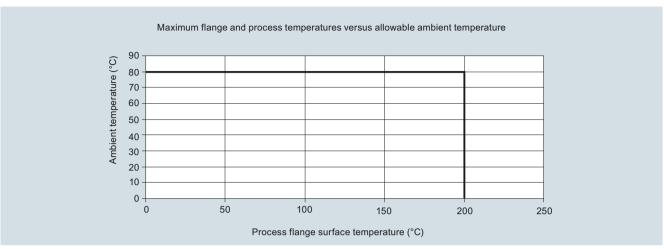
Selection and Ordering data	Article No.		Selection and Ordering data	Order code
SITRANS LR260	7ML5427-		Further designs	
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids to a range of 30 m (98.4 ft).	0 - 0 -		Please add "-Z" to Article No. and specify Order code(s).	
Order handheld programmer separately   → Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Process connection			Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)			Inspection Certificate Type 3.1 per EN 10204 <sup>4)</sup>	C12
2 inch/50 mm	A		Operating Instructions for HART/mA device	Article No.
3 inch/80 mm	В		English	7ML1998-5KE03
4 inch/100 mm	С		German	A5E34942821
6 inch/150 mm	D		Note: The Operating Instructions should be	A3E34342021
Threaded connection			ordered as a separate line item on the order.  Multi-language Quick Start manual	A5E32106122
2" NPT (ASME B1.20.1) (tapered thread) <sup>1)2)5)</sup>	E		This device is shipped with the Siemens Milltronics	A3E32100122
R 2" [(BSPT), EN 10226-1] (tapered thread) <sup>1)2)5)</sup>	F		manual DVD containing the ATEX Quick Start and	
G 2" [(BSPT), EN ISO 228-1] (parallel thread) <sup>1)2)5)</sup>	G		Operating Instructions library.	
Antenna			Operating Instructions for PROFIBUS PA device	
2" Horn antenna, fits 50 mm or 2" nozzles <sup>1)</sup>	Α		English	7ML1998-5KF03
2" Horn antenna with 100 mm extension 1)	В		German	A5E34957877
2" Horn antenna with 200 mm extension 1)	C		Note: The Operating Instructions should be ordered as a separate line item on the order.	
2" Horn antenna with 500 mm extension 1)2)	D		Multi-language Quick Start manual	A5E32114443
2" Horn antenna with 1 000 mm extension <sup>1)2)</sup>	E		This device is shipped with the Siemens Milltronics	
3" Horn antenna, fits 80 mm or 3" nozzles <sup>3)</sup>	F		manual DVD containing the ATEX Quick Start and Operating Instructions library.	
3" Horn antenna with 100 mm extension <sup>3)</sup>	G		Accessories	
3" Horn antenna with 200 mm extension <sup>3)</sup>	Н			
3" Horn antenna with 500 mm extension <sup>2)3)</sup>	J		One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART	7ML1930-1AP
3" Horn antenna with 1 000 mm extension <sup>2)3)</sup>	K			7MI 1020 140
4" Horn antenna, fits 100 mm or 4" nozzles	L		One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA	7ML1930-1AQ
4" Horn antenna with 100 mm extension	M		Handheld programmer, Infrared, Intrinsically Safe	7ML1930-1BK
4" Horn antenna with 200 mm extension	N		Dust cap, PTFE, for 2 inch/50 mm horn	7ML1930-1DE
4" Horn antenna with 500 mm extension <sup>2)</sup>	P		Dust cap, PTFE, for 3 inch/75 mm horn	7ML1930-1BL
4" Horn antenna with 1 000 mm extension <sup>2)</sup>	Q		Dust cap, PTFE, for 4 inch/100 mm horn	7ML1930-1BM
<b>Purge (self cleaning) connection</b> No purge connection	0		HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Purge connection	1		SITRANS RD100, loop powered display -	7ML5741
Output/communication 4 20 mA, HART	C		see Chapter 7	784 5740
PROFIBUS PA	1		SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
Cable inlet 2 x M20x1.5			SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion -	7ML5744
2 x ½" NPT		A B	see Chapter 7	
Note: Polymeric cable glands will be provided with M20 devices.			SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
Approvals			For applicable back up point level switch - see point level measurement section	
General purpose, CSA <sub>US/C</sub> , FM, Industry Canada, FCC, CE, R&TTE, RCM		Α _	Note: Products shipped with plastic cable gland,	
CSA/FM Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC, RCM		В	rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.	
ATEX II 1D, 1/2D, 2D Ex ta IIIC T100 °C Da, CE, R&TTE, RCM, INMETRO		С	<ol> <li>Maximum measurement range 10 m (32.8 ft) solids or</li> <li>Available with Purge option 0 only</li> </ol>	20 m (65.6 ft) liquid
Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, Industry Canada, FCC, RCM		D	3) Maximum measurement range 20 m (65.6 ft) solids or	30 m (98.4 ft) liquid
Intrinsically safe, IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da, R&TTE, RCM		E	<ul> <li>4) Available with pressure option 0 only</li> <li>5) Available with Antenna Options A, B, F, G, L, and M or</li> </ul>	nly
Intrinsically safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada, FCC, RCM		F	6) Available with pressure option 0 only	
Intrinsically safe, South Africa ARP0108 Ex ia IIC T4		G		
Ga				
Ga Pressure rating	-	Ы		
Ga	_	0		

nly

Continuous level measurement - Radar transmitters

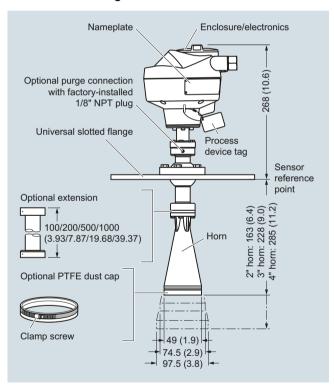
#### SITRANS LR260

## Characteristic curves



SITRANS LR260 Ambient/Process Flange Surface Temperature Curve

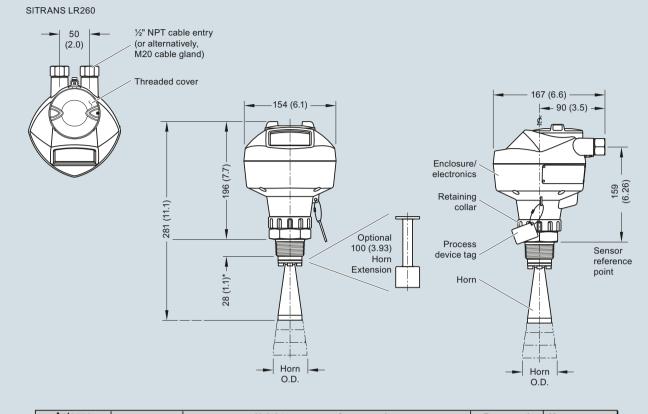
## Dimensional drawings



SITRANS LR260, dimensions in mm (inch)

#### Continuous level measurement - Radar transmitters

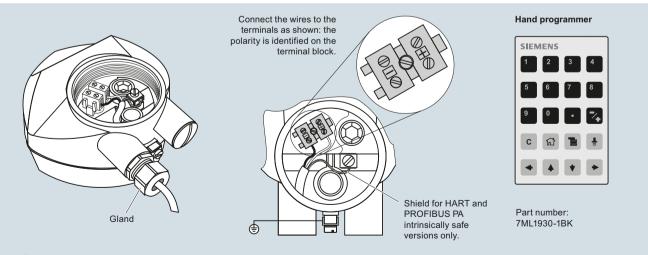
#### **SITRANS LR260**



Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement
1,700		1-1/2" threaded connection	2" threaded connection	3" threaded connection		range
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR260, dimensions in mm (inch)

#### Schematics



#### Notes:

- 1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
- 2. All field wiring must have insulation suitable for rated input voltages.
- 3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- 4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Continuous level measurement - Radar transmitters

#### **SITRANS LR460**

#### Overview



The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

#### Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided guick start wizard for plug and play start-up
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

## Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

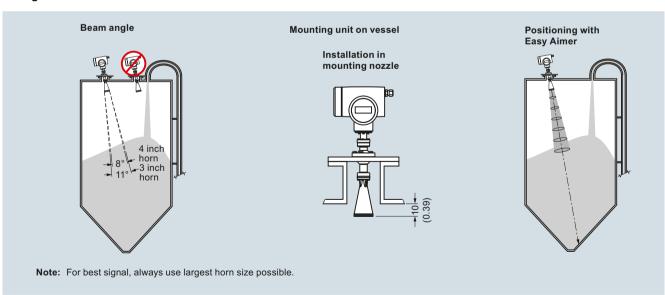
An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

 Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

#### Configuration



SITRANS LR460 installation, dimensions in mm (inch)

# Continuous level measurement - Radar transmitters

## SITRANS LR460

# Technical specifications

Mode of operation	
Measuring principle	FMCW radar level measurement
Frequency	24.2 25.2 GHz FMCW
Measuring range	0.35 100 m (1.15 328.08 ft)
Output	
Analog output (HART)	
Signal range	Optically isolated
Load     Fail-safe	Max. 600 $\Omega$ mA signal programmable as high, low
. a.i. dare	or hold (LOE)
Communication	HART, optional PROFIBUS PA
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01
Performance (Reference conditions according to IEC 60770-1)	
Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range
Non-repeatability	≤ 10 mm (0.4 inch)
Rated operating conditions	
Amb. temperature for enclosure	-40 +65 °C (-40 +149 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	4
Medium conditions	
Dielectric constant	$\varepsilon_r > 1.4$
Process temperature range	-40 +200 °C (-40 +392 °F)
Vessel pressure	0.5 bar g (7.25 psi g) maximum
Design	
Weight	Approx. 6.1 kg (13.4 lb) with 3 inch universal flange
Materials • Enclosure • Degree of protection	Die-cast aluminum, painted IP67/Type 4X/NEMA 4X/ Type 6/NEMA 6
Cable inlet	2x M20x1.5 or ½" NPT
Process connections  • Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure

Programming			
Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver		
Approvals for handheld programmer	r IS model with ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40 °C (104 °F)		
Handheld communicator	HART Communicator 375		
PC	SIMATIC PDM		
Display (local)	Alphanumeric LCD for readout and entry		
Power supply	100 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA)		
	or		
	24 V DC +25/-20 %, 6 W (optional)		
Certificates and approvals			
General	CSA <sub>US/C</sub> , CE, FM, RCM		
Radio	European Radio (R&TTE), Industry Canada, FCC, RCM		
Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III		
	ATEX II 1D, 1/2 D, 2D T85 °C		
	INMETRO ExtD A20 IP67 T85 °C		
	GOST Ex DIP A20 Ta 85 °C IP67		
Optional equipment			
Dust cap	PTFE		
Air purge connection	1/8" NPT		

## Continuous level measurement - Radar transmitters

## SITRANS LR460

Selection and Ordering data	Article No.
SITRANS LR460	7ML5426-
4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.	0 - 0 - 0
Order handheld programmer separately	
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball 3 inch (80 mm)	A
4 inch (100 mm)	B
6 inch (150 mm)	С
Antenna	
3" horn antenna, fits 80 mm (3 inch) nozzles 3" horn antenna, fits 80 mm (3 inch) nozzles with	A B
100 mm extension	c
3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension	
3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension 1)	D
3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension <sup>1)</sup>	E
4" horn antenna, fits 100 mm (4 inch) nozzles	F
4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension	G
4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension	Н
4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension 1)	J
4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension <sup>1)</sup>	K
Purge (self-cleaning) connection	
No purge connection  Purge connection	0
Output/Communication	_
4 20 mA, HART PROFIBUS PA	0
Power supply/cable inlet	- '
100 230 V AC	
• 2 x M20x1.5	A
• 2 x ½" NPT	В
24 V DC • 2 x M20x1.5	С
• 2 x ½" NPT	D
Approvals General Purpose, CSAus/c, Industry Canada, FM, FCC, CE and R&TTE, RCM	A
CSA/FM Class II, Div. 1, Groups E, F, and G, Class III	В
ATEX II 1/2 D T6, CE, R&TTE	С
1) Available with Burge ention Conty	

<sup>1)</sup> Available with Purge option 0 only

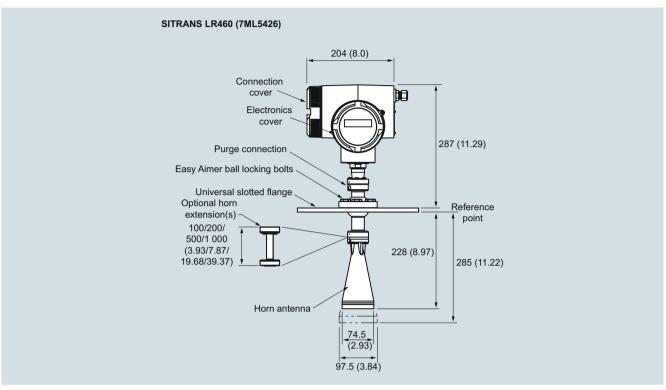
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Operating Instructions	Article No.
English	7ML1998-5JM02
French	7ML1998-5JM11
German	7ML1998-5JM32
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32007360
Accessories	
Handheld programmer, Infra-red, Intrinsically Safe, EEx ia	7ML5830-2AJ
Dust cap, PTFE, for 3 inch/80 mm horn	7ML1930-1BL
Dust cap, PTFE, for 4 inch/100 mm horn	7ML1930-1BM
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART <sup>1)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA <sup>1)</sup>	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

 $<sup>^{1)}</sup>$  Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

Continuous level measurement - Radar transmitters

SITRANS LR460

## Dimensional drawings

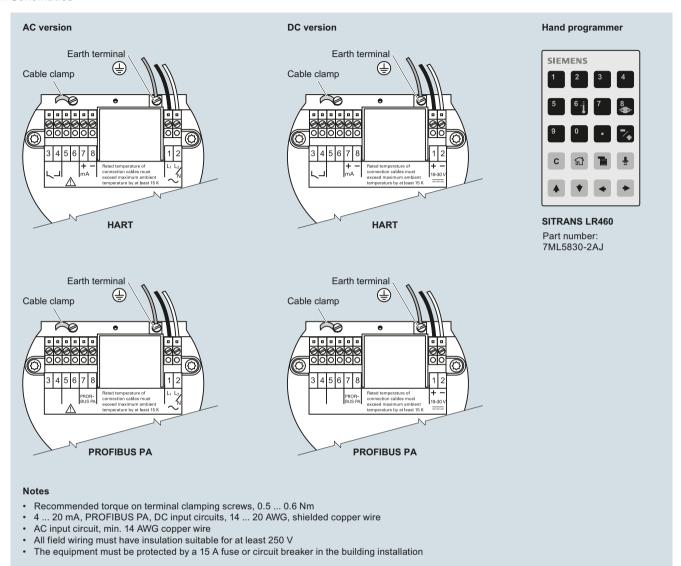


SITRANS LR460, dimensions in mm (inch)

Continuous level measurement - Radar transmitters

#### SITRANS LR460

## Schematics



SITRANS LR460 connections

## Continuous level measurement - Radar transmitters

## SITRANS LR260/LR460 Specials

## Selection and ordering data

Selection and ordering data	
SITRANS LR260/LR460 Specials	
	Article No.
Process connection part kits - non-pressure-rated	
LR260/LR460,100 mm extension for horn antenna, no purge <sup>1)</sup>	A5E01087872
LR260/LR460, 200 mm extension for horn antenna, no purge <sup>1)</sup>	A5E01091262
LR260/LR460,100 mm extension for horn antenna with purge <sup>1)</sup>	A5E01261979
LR260/LR460, 200 mm extension for horn antenna with purge <sup>1)</sup>	A5E01261981
LR260/LR460, horn 2", no purge, no emitter <sup>1)</sup>	A5E02083905
LR260/LR460, horn 3", no purge, no emitter <sup>1)</sup>	A5E01623511
LR260/LR460, horn 4", no purge, no emitter <sup>1)</sup>	A5E01623512
LR260/LR460, horn 2", with purge, no emitter <sup>1)</sup>	A5E02083906
LR260/LR460, horn 3", with purge, no emitter <sup>1)</sup>	A5E01623513
LR260/LR460, horn 4", with purge, no emitter <sup>1)</sup>	A5E01623514
LR260/LR460, 3" universal flat faced flange <sup>1)</sup>	A5E02303897
LR260/LR460, 4" universal flat faced flange <sup>1)</sup>	A5E01259467
LR260/LR460, 6" universal flat faced flange <sup>1)</sup>	A5E01261834
LR260/LR460 O-rings for Easy Aimer <sup>1)</sup>	A5E01261836
Kit, Emitter for LR260/LR460 <sup>1)</sup>	A5E02360694
LR260 lid with O-ring	A5E02465410
Purge conversion kit – non-pressure-rated	
(no flange or extension included)	
LR260/LR460 purge conversion, 2" horn <sup>1)</sup>	A5E02083914
LR260/LR460 purge conversion, 3" horn <sup>1)</sup>	A5E02083915
LR260/LR460 purge conversion, 4" horn <sup>1)</sup>	A5E02083916
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection	A5E02203605
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection	A5E02213423
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection	A5E02165924
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection	A5E02213428
Sitrans LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option D, no process connection	A5E03934184
Sitrans LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option E, no process connection	A5E03934187
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option F, no process connection	A5E03934191
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option F, no process connection	A5E31820689

SITRANS LR260/LR460 Specials	
	Article No.
Enclosure with electronics (LR460)	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02182085
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02212422
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212423
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212424
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212425
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212426
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212428
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212429

<sup>1)</sup> Available with no pressure rating, 0.5 bar g maximum. Please contact ceg.smpi@siemens.com for special requests.

Continuous level measurement - Radar transmitters

#### **SITRANS LR560**

#### Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

#### Benefits

- · Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product build-up
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

#### Application

SITRANS LR560's plug and play performance is ideal for most solids applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

ŠITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

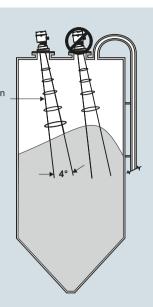
 Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

## Configuration

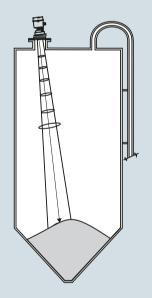
#### Installation

#### Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density
   Emission
- The peak energy density cone is directly in front of and in line with the antenna
- There is signal transmitted outside of the beam angle; therefore false targets may be detected



Aiming will assist in measuring material in the cone



SITRANS LR560 installation, dimensions in mm (inch)

## Continuous level measurement - Radar transmitters

## **SITRANS LR560**

## Technical specifications

reclinical specifications	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	78 GHz FMCW
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point
Maximum measuring range <sup>1)</sup>	<ul><li>40 m (131 ft) version</li><li>100 m (328 ft) version</li></ul>
Output	
Analog output	4 20 mA
Communications	<ul><li>HART</li><li>Optional: PROFIBUS PA</li><li>Optional: FOUNDATION Fieldbus</li></ul>
Fail-safe	<ul> <li>Programmable as high, low or hole (Loss of Echo)</li> <li>NE43 programmable</li> </ul>
Performance (according to reference conditions IEC60770-1)	
Maximum measured error (including hysteresis and non-repeatability) <sup>2)</sup>	5 mm (0.2 inch)
Rated operating conditions (according to reference conditions IEC60770-1)	
Installation conditions • Location	Indoor/outdoor
Ambient conditions (enclosure)	
<ul><li>Ambient temperature</li><li>Installation category</li><li>Pollution degree</li></ul>	-40 +80 °C (-40 +176 °F)
Medium conditions	
Dielectric constant $\epsilon_r$	> 1.6
Process temperature and pressure	See chart below
Design	
Enclosure	316L/1.4404 stainless steel M20x1.5, or ½" NPT via adapter 1/8" NPT, 30 cfm at max. 100 psi • 40 m version: PEI • 100 m version: PEEK
	Damage to lens could result from continuous purging/cleaning due to abrasive solids. Recommended purging/cleaning only a few seconds every hour
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 with lid closed
Weight	3.15 kg (6.94 lb) including 3 inch flange
Optional local display interface	Graphic LCD, with bar graph representing level
Process connections • Universal flat-faced flanges <sup>3)</sup>	• 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel • 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel
• Aimer flanges <sup>3)</sup>	3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum

aluminum

Power supply	
4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 $\Omega$
PROFIBUS PA/ FOUNDATION Fieldbus	13.5 mA 9 32 V DC, per IEC 61158-2
Certificates and approvals	
General	CSA <sub>US/C</sub> , CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, RCM
Hazardous • Europe/International	IECEx SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C Da IP68 ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc
US/Canada	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4
• China	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C, IP68
Brazil	INMETRO BR-Ex nA/nL II T4 IP68
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T $_a=-20\ldots+50$ °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T $_a=50$ °C
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM, AMS, PACTware
Display (local)	Graphic local user interface including quick start wizard and echo profile displays
1) =	

- 1) From sensor reference point
- Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)
- 3) Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/ JIS 2220 (10K) bolt hole pattern.

#### Process temperature and pressure

Version	Stainless steel	Aimer flange: -1 0.5 bar	Aimer flange: -1 3.0 bar
40 m	-40 +100 °C	-40 +100 °C	-40 +100 °C
	(-40 +212 °F)	(-40 +212 °F)	(-40 +212 °F)
100 m	-40 +200 °C	-40 +200 °C	-40 +120 °C
	(-40 +392 °F)	(-40 +392 °F)	(-40 +248 °F)

#### Continuous level measurement - Radar transmitters

#### **SITRANS LR560**

Selection and Ordering data		Art	icl	e No	).		
SITRANS LR560		7M	IL5	440			
2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).		ľ		00	T		
Order handheld programmer separately							
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.							
Measurement and process temperature range 40 m (131 ft) max range, -40 +100 °C 100 m (329 ft) max range, -40 +200 °C	•	0 1					
Process connection Universal flat-faced flange fits ANSI/DIN/JIS flanges							
3 inch/80 mm, 304 stainless steel 4 inch/100 mm, 304 stainless steel 6 inch/150 mm, 304 stainless steel	• • •	E	3				
3 inch/80 mm, 316L stainless steel 4 inch/100 mm, 316L stainless steel 6 inch/150 mm, 316L stainless steel	• • •	E F					
3 inch/80 mm, painted aluminum, with integral aimer <sup>1)</sup> 4 inch/100 mm, painted aluminum, with integral	•	G H					
aimer <sup>1)</sup> 6 inch/150 mm, painted aluminum, with integral aimer <sup>1)</sup>	•	J					
Enclosure (with cable inlet) Stainless steel, 1 X ½* NPT Stainless steel, 1 X M20 x 1.5 (plastic gland included)	•		A B				
Pressure rating 0.5 bar g (7.5 psi g) maximum 3 bar g (40 psi g) maximum	•				0		
Output/communication 4 20 mA, HART PROFIBUS PA FOUNDATION Fieldbus					A B C		
Approvals							
General Purpose, CSA <sub>US/C</sub> , Industry Canada, FCC, CE, R&TTE, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II,						A B	
Div.1, Groups E, F, G, Class III  ATEX II 1 D, ½ D, 2 D, 3G Ex nA/nL, CE, R&TTE, RCM	•					С	
Local display interface Without LDI (local display interface) With LDI (local display interface)	•					1 2	

 $<sup>^{1)}</sup>$  Rated to 120  $^{\circ}\text{C}$  max. when used with Pressure rating option 1

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix

Selection and Ordering data	Order code
Further designs	51401 0040
Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating connector <sup>1)2)3)</sup>	A50
Plug 7/8" with mating connector <sup>1)3)7)</sup>	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204 <sup>4)</sup>	C12
NAMUR NE43 compliant, device preset to failsafe $ \bullet  $ < 3.6 mA <sup>5)</sup>	N07
Operating Instructions for HART device	Article No.
English	A5E34647946
German	7ML1998-5KB32
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32052143
Operating Instructions for PROFIBUS PA device	
English	A5E34648471
German	7ML1998-5LT32
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32043113
Operating Instructions for FOUNDATION Fieldbus device	
English	A5E34648692
German	7ML1998-5LY32
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32034712
Accessories	
Hand Programmer, Intrinsically safe	7ML1930-1BK
Local display interface	7ML1930-1FJ
Sun Shield Cover, 304 stainless steel Housing lid with window	7ML1930-1FK 7ML1930-1FL
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), HART <sup>6)</sup>	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 +80 °C (-40 +176 °F), PROFIBUS PA <sup>6</sup> )	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chap. 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

<sup>1)</sup> Available with Approval option A only

<sup>2)</sup> Available with Enclosure option B only

 $<sup>^{\</sup>rm 3)}$  Available with Output/communication options B and C only

<sup>4)</sup> Available with Pressure rating option 1 only

<sup>5)</sup> Available with Output/communication option A only

<sup>6)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended

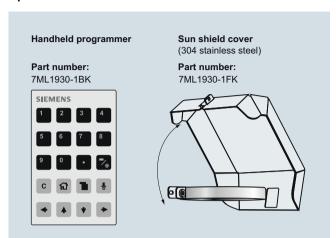
<sup>7)</sup> Only available with enclosure option A (NPT thread)

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix

Continuous level measurement - Radar transmitters

SITRANS LR560

## Options

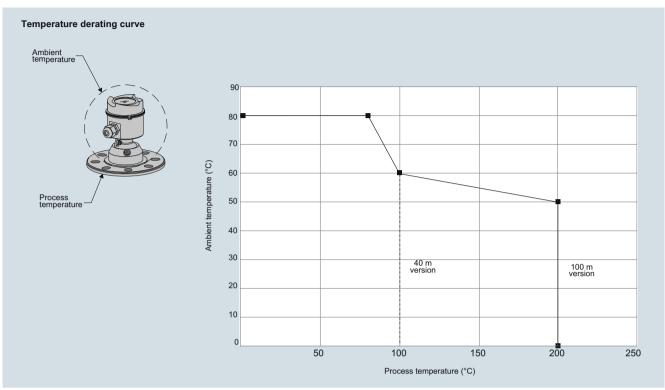


SITRANS LR560 handheld programmer and sun shield cover

Continuous level measurement - Radar transmitters

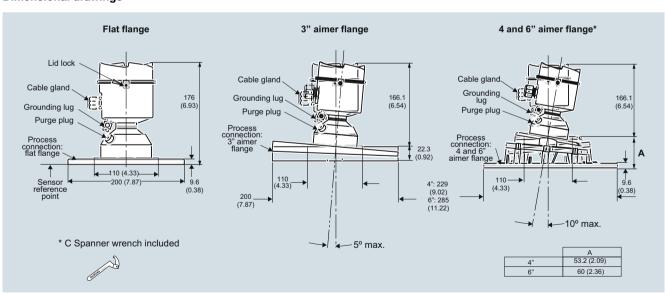
#### SITRANS LR560

## Characteristic curves



SITRANS LR560 temperature derating curve

## Dimensional drawings

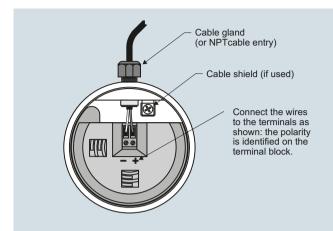


SITRANS LR560, dimensions in mm (inch)

#### Continuous level measurement - Radar transmitters

## **SITRANS LR560 Specials**

## Schematics



- 1. Depending on the approval rating, glands and plugs may be
- Depending on the approval rating, glands and plugs may be supplied with your instrument.
   DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
   All field wiring must have insulation suitable for rated input voltages.
   Use shielded twisted pair cable (14 ... 22 AWG) for HARTversion.
   Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections

## Selection and ordering data

SITRANS LR560 Specials	
	Article No.
LR560 Electronics Modules	
LR560 Electronics Module, HART, 100 m range, compatible with 7ML54401XX00XAXX, no enclosure or process connection included.	7ML1830-3AC
LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML54401XX00XBXX, no enclosure or process connection included.	7ML1830-3AH
LR560 Electronics Module, FOUNDATION Fieldbus, 100 m range, compatible with 7ML54401XX00XCXX, no enclosure or process connection included.	7ML1830-3AJ
LR560 Electronics Module, HART, 40 m range, compatible with 7ML54400XX00XAXX, no enclosure or process connection included.	7ML1830-3AK
LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML54400XX00XBXX, no enclosure or process connection included.	7ML1830-3AL
LR560 Electronics Module, FOUNDATION Fieldbus, 40 m range, compatible with 7ML54400XX00XCXX, no enclosure or process connection included.	7ML1830-3AM
LR560 Miscellaneous Spare Kits	
Kit, Lid Gasket, EPDM, LR560	7ML1830-3AA
Kit, Wrench for 4" and 6" Aimers, LR560	7ML1830-3AB
Kit, O-rings for 3" Aimer, LR560	7ML1830-3AD
Kit, O-rings for 4" Aimer, LR560	7ML1830-3AE
Kit, O-rings for 6" Aimer, LR560	7ML1830-3AF
Kit, Lid Screw and Purge Plug set with Hex Keys, LR560	7ML1830-3AG
Kit, Lid, No Window, LR560	7ML1830-3AP

Please contact ceg.smpi@siemens.com for special requests.

Guided wave radar transmitters

#### **Guided wave radar transmitters**

#### Overview

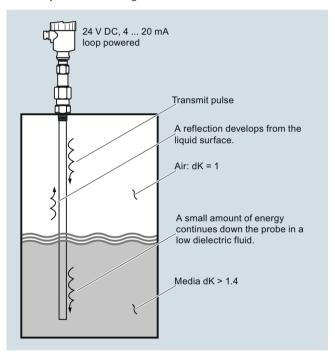
#### Introduction

Guided Wave Radar transmitters use TDR (time domain reflectometry).

#### Time Domain Reflectometry (TDR)

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

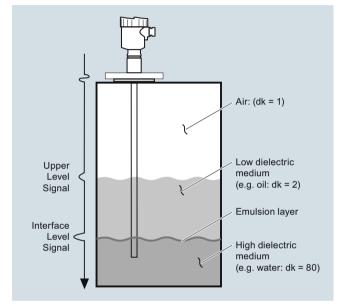
The SITRANS LG includes a transmitter and waveguide that has a characteristic impedance in air and is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.



#### Mode of operation

#### Interface Detection

The SITRANS LG, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.6 and 10 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



Guided wave radar transmitters

Guided wave radar transmitters

Application

## **SIEMENS**

Customer information	
Contact: Prepare	
Company: Date:	
Address: Notes o	
City: Country:	
Zip/Postal Code: Phone: (	
E-mail: Fax: ( )	
Tank/Vessel Information  (supply sketch where possible)  Sketch attached  Liquids  Sketch attached  Liquids  Tank top:  Tank bottom:  Mounting location:  Top mount  Flat  Flat  Thread mount  Conical  Conical  Parabolic  Parabolic  Sketch attached  Sketch attached  Sketch attached  Byeass/Sidepipe mount	Tank dimensions:  Height: m/ft  Diameter: m/ft  Nozzle Length: cm/inch  Nozzle Diameter: cm/inch  Process connection type:  Process connection size:  Distance to sidewall: cm/inch  Pressure:
Pipe mount  Displacer replacement  (please supply drawings)	Normal: Maximum (relief):
Material being measured:  Material temperature: Norm:°C/°F Max:°C/°F  Measurement type:	Liquid Solid Slurry  Particle size:  Fine dust/powder, <0.5 cm (0.2 inch) Grains (rice, corn), <2 cm (0.8 inch) Small stones/gravel, <2 cm (0.8 inch) Small rocks/chunks, >2 cm (0.8 inch) Large particles, <9 cm (3.5 inch)
	Foam type:  None Wet  Dry Wet/dense
Installation (indicate all that apply)  Power available: Communications: Outputs require	<b>d:</b>

Guided wave radar transmitters

**Guided wave radar transmitters** 

# **SIEMENS**

Customer info	rmation		
Contact:		Pre	pared By:
Company:		Dat	e:
Address:		Not	es on the Application:
E-mail:	Fax: _	( )	
Tank/Vessel Info	rmation (supply sketch wh	nere possible) Sketch attached	Tank dimensions:  Height: m/ft
Tank top:	Tank bottom:	Mounting location:	Diameter: m/ft
Open	Sloped	☐ Top mount	Nozzle Length: cm/in-
☐ Flat	☐ Flat	☐ Thread mount	Nozzle Diameter: cm/in
Conical	Conical	☐ Flange mount	Process connection type:
Parabolic	Parabolic	☐ Bypass/Sidepipe Mount	Process connection size:
Pressure:		☐ Pipe mount	Distance to sidewall: cm/in
		Displacer replacement (please supply drawings)	
Maximum (relief): _		- (please supply drawings)	
Interface Data			
Upper material:		Lower material:	Emulsion layer: Yes
Upper material thic	kness:cm/inc		·
	ectric:		Emulsion thickness:cm/inc
Material			
	asurod:		
_		_ °C/°F Max:°C/°	F
_		Turbulence:  Yes	l "Y
		— Density:kg/m³	
Kinematic Viscosity (cs	St) = Dynamic Viscosity (cP)	/ Density (kg/m³)	Upper     Upper   material
☐ 1 5 cSt (like v	vater) 50.	100 cSt (like honey)	laver
5 20 cSt (like	machine oil) 100	500 cSt (like syrup/molasses	Lower material
20 50 cSt (like	e cooking oil)	00 cSt (like tar)	
Installation			
Power available:		Outputs require	ed:
Communications	: 🔲 HART/ 4 20 r	mΔ	Other (please specify)

#### Guided wave radar transmitters

#### SITRANS LG series

#### Overview



The Siemens SITRANS LG series are guided wave radar transmitters for level, level/interface, and volume measurement of liquids and solids. The Sitrans LG product line can handle changes in process conditions, high temperatures and pressures, and steam.

#### Benefits

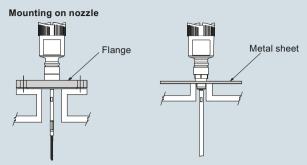
- High accuracy to +/- 2 mm
- · Advanced Diagnostics available for high degree of safety
- Simple menu driven display offers ease of setup
- Large range of options offers reliability in most continuous measurement applications
- Ease of maintenance through module design and field replaceable and adjustable probe options
- Perfect solution for wide range of applications from storage to interface with options for extreme pressure and temperature conditions
- Universally applicable in liquids, interface, slurries and solids
- · Highly immune to build-up using auto learn function
- Wide range of Hygienic options

#### Application

The SITRANS LG series comes in four different models, depending on the applications, level of performance, and functionality required:

- SITRANS LG240 offers configuration options for your hygienic and corrosive application requirements
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile offering solutions for storage, separation of materials or difficult ammonia applications
- SITRANS LG260 Ideal for measuring level in medium range solids applications including; grains, plastics, and cement
- SITRANS LG270 offers configuration options for extreme conditions including high temperature and high pressure applications such as: harsh applications found in chemical, HPI and energy industries for example, LPG gas tanks, steam boilers and distillation columns

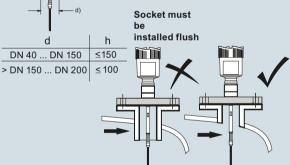
## Configuration



#### Installation in non-metal vessel

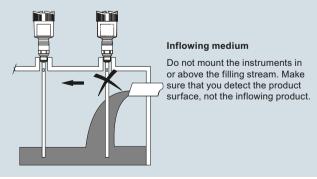
The guided microwave principle requires a metal surface on the process fitting. Therefore, use in plastic vessels etc. an instrument version with flange (from DN 50) or place a metal sheet,  $\emptyset$  > 200 mm (8 inch), beneath the process fitting when screwing it in. Make sure that the plate has direct contact with the process fitting

# Mounting socket If possible, avoid sockets, mount the sensor flush with the vessel top. If this is not possible, use short sockets with small diameter. Higher sockets or sockets with a bigger diameter can generally be used. They simply increase the upper blocking distance. Check if this is relevant for your measurement. In such cases, always carry out a false signal suppression after installation. Socket must be



When welding the socket, make sure that the socket is flush to the vessel ton

Before beginning the welding work, remove the electronics module from the sensor. By doing this, you avoid damage to the electronics through inductive coupling.



SITRANS LG Series installation

## Guided wave radar transmitters

## SITRANS LG series

## Technical specifications

Technical specifications	
Mode of operation	
Measuring principle	Guided wave radar measurement
Measuring range	300 75 000 mm (11.81 2 952.75 inch)
Output	
mA analog output with HART digital signal	4 20 mA/HART (SIL optional)
Output range • Analog • Start-up current	Current: minimum 3.8 mA, maximum 20.5 mA ≤ 10 mA for 5 ms after switching on,
Diagnostic alarm	≤ 3.6 mA  Failure signal current output (adjustable): last valid measured value, ≥ 21 mA, ≤ 3.6 mA
Digital communication	HART Version 7 x and multidrop compatible
Modbus	Modbus RTU, Modbus ASCII
PROFIBUS PA	
Performance	Process reference conditions according to DIN EN 61298-1
Non-linearity • Coaxial	
Single rod probes	
Interface models	See manual for more details
Resolution and repeatability	Accuracy +/- 2 mm (0.08 inch)
Accuracy • Coaxial/rod/cable probes • Interface models	± 2 mm (0.08 inch) ± 5 mm (0.197 inch) (Note: Typical deviation, Interface measurement) See manual for more details
Electromagnetic compatibility (check	See manual for more details
if needed) • Measuring cycle time	< 500 ms
• Step response time	≤ 3 s
Temperature Effects	The measurement error from the process conditions is in the specified pressure and temperature range of below 1 %
Rated operating conditions	10 00 00 / 10 :== :="
Ambient temperature for enclosure     LCD readable temperature range	-40 +80 °C (-40 +176 °F) -40 +80 °C (-40 +176 °F) with display heated option
Location     Installation category	Indoor/outdoor
<ul><li>Pollution degree</li><li>Relative Humidity</li></ul>	2 20 85 %
Medium conditions	
Dielectric constant	dK ≥ 1.4 (configuration dependent)  Note: for measurement below 1.4 use
	probe end tracking.
Process temperature range	-196 +450 °C (-321 +842 °F)
Vessel pressure	-1 +400 bar (-100 +40 000 kPa)

Design	
Instrument weight (dependent on pro- cess fitting) - see manual for further details	Approx. 0.8 8 kg (0.176 17.64 lb)
Materials	
• Enclosure	Plastic housing plastic PBT (Polyester) Aluminum die-casting housing, aluminum die-casting AlSi 10 mg, powder-coated- basis: polyester Stainless steel housing, precision casting 316L Stainless steel housing, electropolished 316L
Degree of protection	<ul> <li>Type 4/NEMA 4, IP65</li> <li>Plastic housing IP66/IP67</li> <li>Aluminum and stainless steel housings are IP 66/68</li> </ul>
Cable inlet	2x M20x1.5 or 2 x ½" NPT
Process connections • Pipe thread, cylindrical (ISO 228 T1)	G¾" A, G1" A, G1½" A according to DIN 3852-A
<ul> <li>American pipe thread, conical (ASME B1.20.1)</li> </ul>	34" NPT, 1" NPT, 1½" NPT
• Flanged	DIN from DN 25, ANSI from 1"
• Hygienic	Hygienic fittings
Programming	
Local	Four button, menu-driven data entry
Handheld communicator	
	Hart communicator
PC	Hart communicator SIMATIC PDM, AMS, PACTware
Power	SIMATIC PDM, AMS, PACTware
·	
Power	SIMATIC PDM, AMS, PACTware
Power 2 wire Hart version	9.6 35 V DC 9.6 48 V DC, 20 42 V AC, 50/60 Hz and
Power 2 wire Hart version 4 wire versions	9.6 35 V DC 9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz
Power 2 wire Hart version 4 wire versions  Modbus	9.6 35 V DC 9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz
Power 2 wire Hart version 4 wire versions  Modbus	9.6 35 V DC 9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz 8 30 V DC 9 32 V DC  Note: see manual for specific power
Power 2 wire Hart version 4 wire versions  Modbus PROFIBUS PA	9.6 35 V DC 9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz 8 30 V DC 9 32 V DC  Note: see manual for specific power
Power 2 wire Hart version 4 wire versions  Modbus PROFIBUS PA  Certificates and approvals	SIMATIC PDM, AMS, PACTware  9.6 35 V DC  9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz  8 30 V DC  9 32 V DC  Note: see manual for specific power based on ordered options
Power 2 wire Hart version 4 wire versions  Modbus PROFIBUS PA  Certificates and approvals Hazardous approvals:	SIMATIC PDM, AMS, PACTware  9.6 35 V DC  9.6 48 V DC, 20 42 V AC, 50/60 Hz and 90 253 V AC, 50/60 Hz  8 30 V DC  9 32 V DC  Note: see manual for specific power based on ordered options  ATEX, FM, CSA, IECex

## Guided wave radar transmitters

	SITRANS LG240	SITRANS LG250	SITRANS LG260	SITRANS LG270
Industries	Food, Beverage and Pharmaceutical	Chemical/HPI/Power/General	Cement, power generation, food, processing, mineral processing, mining	Chemical/HPI/Power/General
Applications	Hygienic and corrosive applications	Liquids, storage and process vessels with agitators, vaporous liquids, interface	Cement, fly ash, grain, coal, flour, plastics	Aggressive applications in liquids, storage and process vessels with agitators, vaporous liquids, high temperatures and pressures, low dielectric media
Range	32 m	75 m	60 m	60 m
Performance	+/- 2 mm	+/- 2 mm	+/- 2 mm	+/- 2 mm
Temperature	-40 +150 °C (-40 +302 °F)	-40 +200 °C (-40 +392 °F)	-40 +200 °C (-40 +392 °F)	-196 +450 °C (-320.8 +842 °F)
Communications	4 20 mA/HART     Modbus: Modbus RTU, Modbus ASCII     PROFIBUS PA     SIMATIC PDM     DTM/FDT for PACTware     Fieldcare	4 20 mA/HART     Modbus: Modbus RTU, Modbus ASCII     PROFIBUS PA     SIMATIC PDM     DTM/FDT for PACTware     Fieldcare	4 20 mA/HART     Modbus: Modbus RTU,     Modbus ASCII     PROFIBUS PA     SIMATIC PDM     DTM/FDT for PACTware     Fieldcare	4 20 mA/HART     Modbus: Modbus RTU,     Modbus ASCII     PROFIBUS PA     SIMATIC PDM     DTM/FDT for PACTware     Fieldcare

## Guided wave radar transmitters

Selection and Ordering data	Article No. Order Code	Selection and
SITRANS LG240	7ML5880-	SITRANS LG
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.		Guided Wave corrosive cont measurement
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		Bolting DN 50 1.4435(BN2) <sup>4</sup>
Approvals		Bolting DN 50
Ordinary location CE <sup>9)</sup> ATEX II 1G, 1/2G, 2G Ex ia IIC T6 <sup>9)</sup>	0 A 0 E	1600 Bolting DN 65
	0 H	1600
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D,1/2D, 1/3D, 2D, Ex t IIIC IP66 T <sup>11)13)15)24)</sup>		Flange DN 25 PTFE-TFM 160
ATEX II 1/2G, 2G Ex d ia IIC T6 <sup>1)12)</sup>	0 J	Flange DN 40
ATEX II 1/2G, 2G Ex.d ia IIC + ATEX II 1/2D, 2D IP6x <sup>1)11</sup> ) <sup>12</sup> ) <sup>13</sup> ) <sup>15</sup> ) <sup>24</sup> )	0 K	PTFE-TFM 160 Flange DN 50
ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T11)13)15)24)	0 N	PTFE-TFM 160
IEC Ex ia IIC T6 <sup>9)</sup>	0 P	Flange DN 50 PTFE-TFM 160
IEC Ex ia IIC T6 + IEC IP6x T tD <sup>11)13)15)24)</sup>	0 Q	Flange DN 65
IEC Ex d ia IIC T6 <sup>1)12)</sup>	0 R	PTFE-TFM 160
IEC Ex. d ia IIC T6 + IEC IP6x T	0 S	Flange DN 80 PTFE-TFM 160
		Flange DN 10
FM (NI) Class I, Div. 2, Groups A, B, C, D FM (IS) Class I, II, III, Div. 1, Groups A, B, C,	1 A 1 B	PTFE-TFM 160
FM (IS) Class I, II, III, DIV. I, Groups A, B, C, D, E, F		Flange DN 80 PTFE-TFM 160
FM(XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)12)</sup>	1 C	Flange DN 10
	1E	PTFE-TFM 16
CSA (NI) Class I, Div. 2, Groups A, B, C, D (DIP) Class II, III, Div. 1, Groups E, F, (311)13)15)	'E	Flange 2" 150 1600
CSA (IS) Class I, II, III, Div. 1, Groups A, B,	1 F	Flange 2" 300 1600
C, D, E, F, G CSA (XP-IS) Class I II III Div 1 Groups A	1 G	Flange 3" 150 1600
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)12)</sup>		Flange 4" 150
Probe version/Material		1600 Nata Theorem
Probe cable ø4 mm (0.16 inch) with gravity weight/PFA <sup>2)7)</sup>	A	Note: The pre- versions is 16
Probe exchangeable rod (ø8 mm) / 1 4435	В	Electronics
(BN2), can be autoclaved (Ra < 0.76 µm) <sup>3)7)</sup>	c	Two-wire 4
Probe exchangeable rod (ø8 mm) / 1.4435 (BN2), (Ra < 0.76 µm) <sup>3)7)</sup>		Four-wire Mod
Probe rod ø10 mm (0.39 inch)/PFA <sup>2)7)</sup>	D	Two-wire 42 qualification 17
Process fitting/Material		Four-wire 42 60 Hz <sup>1)8)10)</sup>
Clamp 2" PN 16 (ø64 mm) DIN 32676,	0 0	Four-wire 4 2
SO2852/1.4435 (BN2) <sup>4)</sup>	0.1	2042 V AC <sup>1)</sup>
Clamp 2" PN 16 (ø64 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 1	PROFIBUS PA
Clamp 2 1/2" PN 10 (ø77.5 mm) DIN 32676, ISO2852/1.4435 (BN2) <sup>4)</sup>	0 2	Seal/Process Without glass
Clamp 2 1/2" PN 10 (ø77.5 mm) DIN 32676,	0 3	(-40 +302 °
ISO2852/PTFE-TFM 1600		FFKM (Kalrez
Clamp 3" PN 10 (ø91 mm) DIN 32676, ISO2852/1.4435 (BN2) <sup>4)</sup>	0 4	(-4 +302 °F)
Clamp 3" PN 10 (ø91 mm) DIN 32676,	0 5	EPDM (Freude
ISO2852/PTFE-TFM 1600		-20130 °C (
Clamp 4" PN6 (ø119 mm) DIN 32676, ISO2852/1.4435(BN2) <sup>4)</sup>	0 6	Housing/Prot
Clamp 4" PN6 (ø119 mm) DIN 32676,	0 7	Plastic IP66/IF Plastic IP66/IF
SO2852/PTFE-TFM 1600		Aluminium/IP6
Bolting DN 32, PN 40 DIN11851/	0 8	stopper
1.4435(BN2) <sup>4)</sup> Bolting DN 32, PN 40 DIN11851/PTFE-TFM	1 0	Aluminium/IP6 stopper
		Aluminium do
1600 Bolting DN 40, PN 40 DIN11851/1,4435	11	(0.2 bar) M20
1600  Bolting DN 40, PN 40 DIN11851/1.4435 (BN2)*)  Bolting DN 40, PN 40 DIN11851/PTFE-TFM	11	

Selection and Ordering data	Article No. Order Code
SITRANS LG240	7ML5880-
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.	*****
Bolting DN 50, PN 25 DIN11851/ 1.4435(BN2) <sup>4)</sup>	1 3
Bolting DN 50, PN 25 DIN11851/PTFE-TFM 1600	1 4
Bolting DN 65, PN 25 DIN11851/PTFE-TFM 1600	1 5
Flange DN 25, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 0
Flange DN 40, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 1
Flange DN 50, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 2
Flange DN 50, PN 40 Form V13, DIN 2513/ PTFE-TFM 1600	2 3
Flange DN 65, PN 40 Form C, DIN 2513/ PTFE-TFM 1600	2 4
Flange DN 80, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 5
Flange DN 100, PN 16 Form C, DIN 2501/ PTFE-TFM 1600	2 6
Flange DN 80, PN 40 EN1092-1 Form B1/ PTFE-TFM 1600	2 7
Flange DN 100, PN 40 EN1092-1 Form B1/ PTFE-TFM 1600	2 8
Flange 2" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 0
Flange 2" 300 lb RF, ANSI B16.5/PTFE-TFM 1600	3 1
Flange 3" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 2
Flange 4" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 3
Note: The pressure limit for all PTFE coated versions is 16 bar (per manual).	
Electronics Two-wire 4 20mA/HART	0
Four-wire Modbus 19)20)21)22)	1
Two-wire 420mA/HART with SIL qualification <sup>17)18)</sup>	2
Four-wire 420mA/HART; 90253V AC; 50/ 60 Hz <sup>1)8)10)</sup>	3
Four-wire 420mA/HART; 9.648V DC; 2042 V AC <sup>1)8)10)</sup> PROFIBUS PA	4 5
Seal/Process temperature	
Without glass seal/-40 +150 °C	A
(-40 +302 °F) <sup>5)11)</sup> FFKM (Kalrez 6221)/-20150 °C	В
(-4 +302 °F) EPDM (Freudenberg 70 EPDM 291)/	С
-20130 °C (-4 +266 °F)	
Housing/Protection/Cable	A
Plastic IP66/IP67 M20x1.5/blind stopper Plastic IP66/IP67 1/2" NPT/blind stopper Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	B C
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	D
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	E
Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	G

## Guided wave radar transmitters

SITRANS LG serie					
Selection and Ordering data	Article No.	Orde	Code	Selection and Ordering data	Order code
SITRANS LG240	7ML5880-	Orac	Code	Further designs (mandatory)	Oraci coac
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.				Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		Н		Supplementary electronics Without	A00
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper		J	Ш	Additional current output 4 20 mA <sup>1)23)</sup> Local display interface	A01
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper		K	Ш	Without Mounted	E00 E01
Stainless steel double chamber/IP66/IP68 0.2 bar) M20x1.5/blind stopper		L	Ш	Laterally mounted <sup>1)</sup> Language of display	E02
Stainless steel double chamber/IP66/IP68 0.2 bar) 1/2" NPT/blind stopper		М	Ш	German English	L00 L01
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel		N	Ш	French Dutch	L02 L03
Aluminium double chamber/IP66/IP68 0.2 bar) M20x1.5/cable gland stainless steel		P	Ш	Italian Spanish	L04 L05
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/Cable gland stain-		Q	Ш	Portuguese Russian	L06 L07
less steel Stainless steel (electropolished) 316L/IP66/		R	Ш	Chinese Japanese	L08 L09
IP68 (0.2 bar) M20x1.5/cable gland stainless steel				Operating instructions	
Aluminium single chamber / IP66/IP68		w		German	M00
0.2 bar) M20x1.5 / Cable gland brass nickel-plated				English French	M01 M02
Aluminium double chamber / IP66/IP68 0.2 bar) M20x1.5 / Cable gland brass		Х	Ш.	Spanish	M03
nickel-plated				Selection and Ordering data	Order code
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		Y	Ш	Further designs (optional)  Please add "-Z" to Article No. and specify Order code(s).	
_engths				Enter the total insertion length in plain text descrip-	Y01
Rod ø8 mm (0.31 inch)/1.4435 (Basle standard 300 4 000 mm)			Ш	tion  Enter the total length of rigid part	Y02
300 1 000 mm (11.81 39.37 inch) <sup>14)</sup>		0		Cleaning included certificate: oil, grease and sili-	W01
001 2 000 mm (39.41 78.74 inch) <sup>14)</sup> 2 001 3 000 mm (78.78 118.11 inch) <sup>14)</sup>		1 2	Ш	cone free  Identification Label (measurement loop) stainless	Y17
3 001 4 000 mm 118.15 157.48 inch) <sup>14)</sup>		3	Ш	steel Identification Label (measurement loop) Foil	Y18
Rod ø10 mm (0.24 inch)/PFA (300 4 000 nm)			Ш	3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) 16)	D07
300 mm (11.81 inch) <sup>14)</sup> 500 mm (19.69 inch) <sup>14)</sup>		9	R1A R1B	3.1-Inspection Certificate for instrument with test data (EN 10204) <sup>16)</sup>	C25
300 1 000 mm (11.81 39.37 inch) <sup>14)</sup>		9	R1C	2.2-Factory certificate for material (EN 10204) <sup>16)</sup>	C15
1 001 5 000 mm (39.41 78.74 inch) <sup>14)</sup>		9	R1D	Quality and test plan <sup>16)</sup>	C26
2 001 3 000 mm (78.78 118.11 inch) <sup>14)</sup> 3 001 4 000 mm		9	R1E R1F	Dye penetration test + 3.1 certificate/instrument <sup>16)</sup>	C13
118.15 157.48 inch) <sup>14)</sup>		Ĭ		X-ray test + 3.1 certificate/instrument <sup>16)</sup>	C14
Cable ø4 mm (0.16 inch)/PFA 500 32 000 mm)				Positive material identification test + 3.1 certificate/instrument <sup>16)</sup>	C16
600 mm (9.69 inch)		9	R1G	Roughness test + 3.1 certificate/instrument <sup>16)</sup>	C18
501 1 000 mm (19.72 39.37 inch)   001 2 000 mm (39.37 196.85 inch)		9	R1H R1J	Pressure test + 3.1 certificate/instrument <sup>16)</sup>	C31
2 001 4 000 mm (196.89 393.70 inch)		9	R1K	Helium leak test + 3.1 certificate/instrument <sup>16)</sup>	C32
4 001 5 000 mm (393.74 590.55 inch) 5 001 10 000 mm (590.59 787.40 inch)		9	R1L R1M	Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument 16)	C60
10 001 10 000 mm (590.59 787.40 inch) 10 001 15 000 mm (787.44 984.25 inch)		9	R1N	Pressure test according to Norsok + 3.1 certificate/instrument (16)	C61
15 001 20 000 mm (984.29 1 181.10 inch)		9	R1P	5 point calibration certificate + 3.1 certificate/instrument <sup>16)</sup>	C62
20 001 25 000 mm (1 181.14 1 377.95 inch) 25 001 32 000 mm		9	R1Q R1R		
20 00 I 32 000 IIIII		9	nin		

## Guided wave radar transmitters

STRANS LG series				
Selection and Ordering data	Article No.	Selection and Ordering data	Article No.	
Additional Operating Instructions		Accessories		
German		SITRANS LG, GWR sensor Display Module	A5E34143449	
4 20 mA/HART - two-wire, PFA insulated	PBD:51041000	SITRANS LG, USB communicator	A5E35192015	
4 20 mA/HART - two-wire, Polished version	PBD:51041001	SITRANS RD100, loop powered display -	7ML5741	
4 20 mA/HART - four-wire PFA insulated	PBD:51041002	see Chapter 7	7MI 5740	
4 20 mA/HART - four-wire Polished version	PBD:51041003	SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740	
Modbus- PFA insulated	PBD:51041004	SITRANS RD300, dual line display with totalizer	7ML5744	
Modbus protocol, Polished version	PBD:51041005	and linearization curve and Modbus conversion -		
PROFIBUS PA, PFA insulated	PBD:51041006	see Chapter 7		
PROFIBUS PA, polished version  Note: Operating instructions should be ordered as a	PBD:51041007	SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750	
separate line on the order.  This device is shipped with the Siemens Milltronics		For applicable back up point level switch - see point level measurement section		
manual DVD containing the operating instructions library.		1) Available with Housing/Protection/Cable options E,F, I	_, M only	
English	-	2) Available only with Process fitting/Material options 01		
4 20 mA/HART - two-wire PFA insulated	PBD:51041037	05, 07, 10, 12, 14 33 (PTFE versions)  3) Available only with Process Fitting/Material options 00	1 02 04 06 09 11	
4 20 mA/HART - two-wire Polished version	PBD:51041038	and 13 [1.4435 (BN2) options]		
4 20 mA/HART - four-wire PFA insulated	PBD:51041039	4) Available with Length options 0, 1, 2, 3 only (Rod ø8 r	' '	
4 20 mA/HART - four-wire Polished version	PBD:51041040	5) Available with Length options R1A R1R only (Rod @ Cable @4 mm/PFA options)	o10 mm/PFA and	
Modbus, PFA insulated	PBD:51041041	7) Available only with the same rod or cable diameter in	Length options	
Modbus protocol, Polished version	PBD:51041042	<li>Available with Supplementary electronic option A00 a interface options E00, E01</li>	nd Local display	
PROFIBUS PA, PFA insulated	PBD:51041043	<ul> <li>9) Available with Supplementary electronic option A01 a</li> </ul>	nd approval options	
PROFIBUS PA, Polished version	PBD:51041044	0A,0E, and 0P		
Note: Operating instructions should be ordered as a separate line on the order.		10) Available with Approval options 0A, 0J, 0K, 0N, 0R, C and 1G	S, 1A,1 C, 1E, 1F,	
This device is shipped with the Siemens Milltronics		<ol> <li>Available with Version/Material options A and D only</li> <li>Available with Local display interface options E00 and E01</li> </ol>		
manual DVD containing the operating instructions library.		13) Available with Seal/Process temperature C only	3 201	
French	-	<sup>14)</sup> Not available with Y02		
4 20 mA/HART - two-wire PFA insulated	PBD:51041111	15) Available with Housing/Protection options C, D, E, F, G, H, L, M		
4 20 mA/HART - two-wire Polished version	PBD:51041112	16) Listed Certificates are not available with all configurat factory for more information	ions, piease contac	
4 20 mA/HART - four-wire PFA insulated	PBD:51041113	17) SIL electronic option 2 available with Approval option:	s OA, OE, OH, ON, OF	
4 20 mA/HART - four-wire Polished version	PBD:51041114	0Q, 1A, 1B, 1E and 1F  18) Available with Supplementary electronic option A00, 1	SII electronics	
Modbus, PFA insulated	PBD:51041115			
Modbus protocol, Polished version	PBD:51041116	1G		
PROFIBUS PA, PFA insulated	PBD:51041117	20) Available with housings/protection/cable options E, F, 21) Available with supplementary electronic option A00	L, IVI and P	
PROFIBUS PA, Polished version	PBD:51041118	22) Available with Local display interface options E00, E0	1	
Note: Operating instructions should be ordered as a separate line on the order.		<sup>23)</sup> Not available with Local display interface option E02 <sup>24)</sup> Available with Housing/protection options D, F, H and		
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.		Note: Please consult manual for further details.		
Spanish				
4 20 mA/HART - two-wire PFA insulated	PBD:51041074			
4 20 mA/HART - two-wire Polished version	PBD:51041075			
4 20 mA/HART - four-wire PFA insulated	PBD:51041076			
4 20 mA/HART - four-wire Polished version	PBD:51041077			
Modbus, PFA insulated	PBD:51041078			
Modbus protocol, Polished version	PBD:51041079			
PROFIBUS PA, PFA insulated	PBD:51041080			
Note: Operating instructions should be ordered as a separate line on the order.				
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.				

## Guided wave radar transmitters

Selection and Ordering data	Article No. Order Code	Selection and Ordering data	Article No. Order Code
SITRANS LG250	7ML5881-	SITRANS LG250	7ML5881-
A guided wave radar sensor for continuous level and interface measurement of liquids.		A guided wave radar sensor for continuous level and interface measurement of liquids.	
Click on the Article No. for the online con-     Control of the online con-     Con		Process fitting/Material	
figuration in the PIA Life Cycle Portal.		Thread G 3/4" (DIN 3852-A) PN 6/316L	0 0
<b>Approvals</b> Ordinary location CE <sup>16)</sup>	0 A	Thread 3/4" NPT (ASME B1.20.1) PN 6/316L Thread G 3/4" (DIN 3852-A) PN 40/316L	0 1 0 2
Shipping approval <sup>19)28)29)</sup>	0 B	Thread 3/4" NPT (ASME B1.20.1) PN 40/316L	0 3
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 <sup>16)</sup>	0 E	Thread G 3/4" (DIN 3852-A) PN 100 / 316L <sup>42</sup> )	0 4
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval 19)28)29)	0 G	Thread 3/4" NPT (ASME B1.20.1) PN 100/ 316L <sup>42)</sup>	0 5
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 <sup>16)23)40)</sup>	0 H	Thread G 1" (DIN 3852-A) PN 40/316L	0 6
ATEX II 1/2G, 2G Ex d ia IIC T6 <sup>1)21)</sup>	0 J	Thread 1" NPT (ASME B1.20.1) PN 40/316L Thread G 1" (DIN 3852-A) PN 100/316L <sup>42)</sup>	0 7 0 8
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1D,	0 K	Thread 1" NPT (ASME B1.20.1) PN 100/316L <sup>42</sup> )	10
1/2D, 1/3D, 2D, Ex t IIIC IP66 T <sup>1)21)23)40)</sup>	0.1	Thread G 1 1/2" (DIN 3852-A) PN 40/316L	11
ATEX II 1/2G, 2G Ex d IIC T6 <sup>14)20)</sup>	O L O M	Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	1 2
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T 14)20)23)40)	O IVI	Thread G1 1/2" (DIN 3852-A) PN 100/316L <sup>42)</sup> Thread 1 1/2" NPT (ASME B1.20.1) PN 100/	1 3 1 4
ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC	0 N	316L <sup>42)</sup>	14
IP66 T <sup>20)23)40)</sup> IEC Ex ia IIC <sup>16)</sup>	0.0	Thread 2 NPT PN 40, ASME B1.20.1/316L <sup>37)38)</sup>	1 5
IEC Ex ia IIC 167	0 P 0 Q	Flange DN 25 PN 40 Form C, DIN 2501/316L Flange DN 25 PN 40 Form F, DIN 2501/316L	2 0 2 1
IEC Ex d ia IIC T6 <sup>1)21)23)40)</sup>	0 R	Flange DN 40 PN 40 Form C, DIN 2501/316L	2 2
IEC Ex d ia IIC T6 + IEC IP6x T tD <sup>1)20)21)40)</sup>	0 S	Flange DN 50 PN 40 Form C, DIN 2501/316L	2 3
IEC Ex d IIC T6 <sup>14)20)</sup>	0 T	Flange DN 50 PN 40 form V13, DIN 2513/316L	2 4
IEC Ex d IIC T6 + IEC IP6x T tD <sup>14</sup> ) <sup>20</sup> ) <sup>23</sup> ) <sup>40</sup> )	0 U	Flange DN 80 PN 40 Form C, DIN 2501/316L	2 5 2 6
FM (NI) Class I, Div. 2, Groups A, B, C, D FM (IS) Class I, II, III, Div. 1, Groups A, B, C,	1 A 1 B	Flange DN 80 PN 40 Form V13, DIN 2501/316L Flange DN 100 PN 16 Form C, DIN 2501/316L	27
D, E, F		Flange DN 100 PN 16 Form C, DIN 2501/316L	2 8
FM(XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)21)</sup>	1 C	Flange DN 100 PN 40 Form C, DIN 2501 /316L	3 0
FM (XP) Class I, Div. 1, Groups A, B, C, D <sup>20)</sup>	1 D	Flange DN 100 PN 40 Form V13, DIN 2513/316L Flange DN 150 PN 16 Form C, DIN 2501/316L	3 1 3 2
CSA (NI) Class I, Div. 2, Groups A, B, C, D (DIP) Class II, III, Div. 1, Groups E, F, G	1 E	Flange DN 50 PN 40 EN1092-1 Form B1/316L	3 3
CSA (IS) Class I, II, III, Div. 1, Groups A, B,	1 F	Flange DN 80 PN 40 EN1092-1 Form B1/316L	3 4
C,D, È, É, G		Flange 1 1/2" 150 lb RF, ANSI B16.5/316L	3 5
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)21)</sup>	1 G	Flange 2" 150 lb RF, ANSI B16.5/316L Flange 2" 300 lb RF, ANSI B16.5/316L	3 6 3 7
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>14)20)</sup>	1 H	Flange 3" 150 lb RF, ANSI B16.5/316L	3 8
Probe version/Material		Flange 3" 300 lb RF, ANSI B16.5/316L	4 0
Proho ovchangoahla cabla g2 mm	A	Flange 4" 150 lb RF, ANSI B16.5/316L Flange 4" 300 lb RF, ANSI B16.5/316L	4 1 4 2
(0.08 inch) with gravity weight/316L <sup>8)9)11)26)</sup> Probe exchangeable cable Ø2 mm	В	Flange 6" 150 lb RF, ANSI B16.5 /316L	4 3
(0.08 inch) center weight/316L <sup>8)9)12)26)</sup>		Flange 6" 300lb RF, ANSI B16.5/316L	4 4
Probe exchangeable cable ø4 mm (0.16 inch) with gravity weight/316L <sup>8)9)11)26)</sup>	С	Flange 1 1/2" 150 lb RF, ANSI B16.5/316L  Electronics	4 5
Due be evelope and ble coble of more	D	Two-wire 4 20mA/HART	0
(0.16 inch) with center weight/316L <sup>8)9)12)26)</sup>		Four-wire Modbus <sup>33)34)35)36)</sup>	1
Probe exchangeable rod ø8 mm (0.31 inch)/316L <sup>2)8)10)11)26)</sup>	E	Two-wire 420mA/HART with SIL qualification <sup>24)32)</sup>	2
Probe exchangeable rod ø12 mm (0.47 inch)/316L <sup>3)8)10)11)24)26)</sup>	F	Four-wire 420mA/HART; 90253V AC; 50/ 60Hz <sup>1)15)17)</sup>	3
	G	Four-wire 420mA/HART; 9.648V DC; 2042V AC <sup>1</sup> ) <sup>15</sup> ) <sup>17</sup> )	4
Probe coax version ø21.3 mm (0.84 inch) with single hole/316L <sup>8)9)11)26)27)</sup>		2042V AC <sup>1)15)17)</sup> PROFIBUS PA	5
Probe coax version ø21.3 mm (0.84 inch) with multiple hole/316L <sup>8/9)11/26/27</sup>	H	THOUBOUTA	
Probe coax version ø42.2 mm (1.66 inch) with multiple hole/316L <sup>5)8)9)11)24)26)27)</sup>	K		

## Guided wave radar transmitters

Selection and Ordering data	Article No. Order	r Code	Selection and Ordering data	Article No.	Order	Code
SITRANS LG250	7ML5881-		SITRANS LG250	7ML5881-		
A guided wave radar sensor for continuous level and interface measurement of liquids.		ш	A guided wave radar sensor for continuous level and interface measurement of liquids.		П	Ш
Seal/Second line of defense/ Process temperature			Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		U	П
FKM (SHS FPM 70C3 GLT)/ without glass seal/-40 +80 °C (-40 +176 °F) <sup>6)</sup> FKM (SHS FPM 70C3 GLT)/ without glass	A B	Ш	Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless		V	
seal/ -40 +150 °C (-40 +302 °F) FKM (SHS FPM 70C3 GLT)/ with glass seal/	C	Ш	steel Aluminium single chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass		w	
-40 +150 °C (-40 +302°F) EPDM (A+P 75.5/KW75F)/ without glass	D	Ш	nickel-plated Aluminium double chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass		х	
seal/ -40 +80 °C (-40 +176 °F) EPDM (A+P 75.5/KW75F)/ with glass seal/ -40 +150 °C (-40 +302 °F)	E	Ш	nickel-plated Stainless steel single chamber (precision		Υ	
FFKM (Kalrez 6375)/ with glass seal/ -20 +200 °C (-4 +392 °F) EPDM (A+P 75.5/KW75F)/ without glass	F G	Ш	casting) / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated  Lengths	_		
seal/-40 +80 °C (-40 +176 °F) <sup>6)</sup>	G		Rod ø8 mm/316L			
EPDM (A+P 75.5/KW75F)/ without glass seal/ -40 +150 °C (-40 +302 °F)	Н	Ш	300 1 000 mm (11.81 39.37 inch) <sup>22)</sup> 1 001 2 000 mm (39.41 78.74 inch) <sup>22)</sup>		0 1	
EPDM (A+P 75.5/KW75F)/ with glass seal/ -40 +150 °C (-40 +302 °F)	J		2 001 3 000 mm (78.78 118.11 inch) <sup>22)</sup>		2	
Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/ -40 +80 °C (-40 +176 °F) <sup>6)</sup>	К	Ш	3 001 4 000 mm (118.15 157.48 inch) <sup>22)</sup> 4 001 5 000 mm (157.52 196.85 inch) <sup>22)</sup> 5 001 6 000 mm (196.89 236.22 inch) <sup>22)</sup>		3 4 5	
Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/ -40 +150 °C (-40 +302 °F)	L	Ш	Rod ø12 mm/316L 300 1 000 mm (11.81 39.37 inch) <sup>22)</sup>		9	R 2 A
Silicone FEP coated (A+P FEP-O-SEAL)/ with glass seal/ -40 +150 °C (-40 +302 °F)	М	Ш	1 001 2 000 mm (39.41 196.85 inch) <sup>22)</sup> 2 001 3 000 mm (78.78 118.11 inch) <sup>22)</sup>		9	R2B R2C
With borosilicate glass lead through/ with glass seal/ -60 +150 °C (-76 +302 °F)	N	Ш	3 001 4 000 mm (118.15 157.48 inch) <sup>22)</sup>		9	R 2 D
FFKM (Kalrez 6375)/ without glass seal/ -20 +200 °C (-4 +392 °F)	P	Ш	Cable lengths ø2 or 4 mm/316L 501 1 000 mm (19.72 39.37 inch)		9	R2E
FKM (SHS FPM 70C3 GLT)/ with glass seal/ -40 80 °C (-40 +176 °F) <sup>6)</sup>	Q	ш	1 000 5 000 mm (39.37 196.85 inch) 5 001 10 000 mm (196.89 393.70 inch)		9	R2F R2G
Housing/Protection/Cable			10 001 15 000 mm (393.74 590.55 inch)		9	R2H
Plastic IP66/IP67 M20x1.5/blind stopper Plastic IP66/IP67 1/2" NPT/blind stopper	A B	Ш	15 001 20 000 mm (590.59 787.40 inch) 20 001 25 000 mm (787.44 984.25 inch)		9	R2J R2K
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	C D	Ш	25 001 30 000 mm (984.29 1 181.10 inch)		9	R 2 L
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper Aluminium double chamber/IP66/IP68	E	Ш	30 001 35 000 mm (1 181.14 1 377.95 inch)		9	R 2 M
(0.2 bar) M20x1.5/blind stopper Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F		35 001 40 000 mm (1 377.99 1 574.80 inch)			R2N
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	L		40 001 45 000 mm (1 574.84 1 771.65 inch) 45 001 50 000 mm		9	R2P R2Q
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	M		(1 771.69 1 968.50 inch) 50 001 55 000 mm			R2R
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper	N		(1 968.54 2 165.35 inch) 55 001 60 000 mm		9	R2S
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	P Q		(2 165.39 2 362.20 inch) 60 001 65 000 mm (2 362.24 2 559.06 inch)		9	R 2 T
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper Stainless steel double chamber/IP66/IP68	R		65 001 70 000 mm (2 559.09 2 755.91 inch)		9	R 2 U
(0.2 bar) 1/2" NPT/blind stopper Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel	s		70 001 75 000 mm (2 759.94 2 952.76 inch)		9	R 2 V
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel	Т					

## Guided wave radar transmitters

Selection and Ordering data	Article No.	Order	Code
SITRANS LG250	7ML5881-		
A guided wave radar sensor for continuous level and interface measurement of liquids.			
Coax ø21.3 mm/316L			
300 1 000 mm (11.81 39.37 inch) <sup>22)</sup>		9	R3A
1 001 2 000 mm (39.41 78.74 inch) <sup>22)</sup>		9	R 3 B
2 001 3 000 mm (78.78 118.11 inch) <sup>22)</sup>		9	R3C
3 001 4 000 mm (118.15 157.48 inch) <sup>22)</sup>		9	R 3 D
4 001 5 000 mm (157.52 196.85 inch) <sup>22)</sup>			
5 001 6 000 mm (196.89 236.22 inch) <sup>22)</sup>		9	R 3 F
Coax ø42.2 mm/316L			
300 1 000 mm (11.81 39.37 inch) <sup>22)</sup>		9	R3G
1 001 2 000 mm (39.41 78.74 inch) <sup>22)</sup>		9	R3H
2 001 3 000 mm (78.78 118.11 inch) <sup>22)</sup>		9	R3J
3 001 4 000 mm (118.15 157.48 inch) <sup>22)</sup>		9	R3K
4 001 5 000 mm (157.52 196.85 inch) <sup>22)</sup>		9	R3L
5 001 6 000 mm		9	R3M
(196.89 236.22 inch) <sup>22)</sup>			

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without 13)	A00
Additional current output 4 20 mA <sup>1)39)</sup>	A01
Dimensions centering weight (diameter/height)	
Without	B00
ø40/30 mm	B01
ø45/30 mm (for 2 inch tubes)	B02
ø75/30 mm (for 3 inch tubes)	B03
ø95/30 mm (for 4 inch tubes)	B04
ø1.57/1.18 inch (for 2 inch schedule 160)	B05
ø1.77/1.18 inch (for 2 inch schedule 40/80)	B06
ø2.95/1.18 inch (for 3 inch schedule 10/40)	B07
ø3.74/1.18 inch (for 4 inch schedule 80)	B08
Rod mounted	
Without Rod, applicable for coax or cable probe types only 18)	C00
Mounted	C01 C02
Not mounted	C02
Local display interface Without <sup>13)</sup>	
	E00
Mounted Laterally mounted <sup>1)</sup>	E01 E02
	E02
Language of display German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
Operating instructions	
German	MOO
English	M01
French	M02

Guided wave rada	r transmitters
SITR	ANS LG series
Selection and Ordering data	Order code
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part	Y02
Cleaning included certificate: oil, grease and silicone free	W01
Identification Label (measurement loop) stainless steel	Y17
Identification Label (measurement loop) Foil	Y18
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) <sup>30)</sup>	D07
3.1-Inspection Certificate for instrument with test data (EN 10204) <sup>30)</sup>	C25
2.2-Factory certificate for material (EN 10204) <sup>30)</sup>	C15
Quality and test plan <sup>30)</sup>	C26
Dye penetration test + 3.1 certificate/instrument <sup>30</sup>	C13
X-ray test + 3.1 certificate/instrument <sup>30)</sup>	C14
Positive material identification test + 3.1 certificate/instrument <sup>30)</sup>	C16
Roughness test + 3.1 certificate/instrument <sup>30)</sup>	C18
Pressure test + 3.1 certificate/instrument <sup>30)</sup>	C31
Helium leak test + 3.1 certificate/instrument <sup>30)</sup>	C32
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument <sup>30)</sup>	C60
Pressure test according to Norsok + 3.1 certificate/instrument <sup>30</sup> )	C61
5 point calibration certificate + 3.1 certificate/instrument <sup>30)41)</sup>	C62
Additional Operating Instructions	Article No.
German	
4 20 mA/HART - two-wire	PBD:51041010
4 20 mA/HART - two-wire coax probe	PBD:51041011
4 20 mA/HART - four-wire	PBD:51041012
4 20 mA/HART - four-wire coax probe	PBD:51041013
Modbus	PBD:51041014
Modbus- coax probe	PBD:51041015
PROFIBUS PA	PBD:51041016
PROFIBUS PA - coax probe	PBD:51041017
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 20 mA/HART - two-wire	PBD:51041047
4 20 mA/HART - two-wire Coax probe	PBD:51041048
4 20 mA/HART - four-wire	PBD:51041049
4 20 mA/HART - four-wire Coax probe	PBD:51041050
Modbus	PBD:51041051
Modbus - coax probe	PBD:51041052
PROFIBUS PA	PBD:51041053
PROFIBUS PA - coax probe	PBD:51041054
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

#### Guided wave radar transmitters

#### **SITRANS LG series**

Selection and Ordering data	Article No.
French	
4 20 mA/HART - two-wire	PBD:51041121
4 20 mA/HART - two-wire Coax probe	PBD:51041122
4 20 mA/HART - four-wire	PBD:51041123
4 20 mA/HART - four-wire Coax probe	PBD:51041124
Modbus	PBD:51041125
Modbus- coax probe	PBD:51041126
PROFIBUS PA	PBD:51041127
PROFIBUS PA - coax probe	PBD:51041128
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Spanish	
4 20 mA/HART - two-wire	PBD:51041084
4 20 mA/HART - two-wire Coax probe	PBD:51041085
4 20 mA/HART - four-wire	PBD:51041086
4 20 mA/HART - four-wire Coax probe	PBD:51041087
Modbus	PBD:51041088
Modbus- Coax probe	PBD:51041089
PROFIBUS PA	PBD:51041090
PROFIBUS PA - coax probe	PBD:51041091
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Accessories	
SITRANS LG, GWR sensor Display Module	A5E34143449
SITRANS LG, USB communicator	A5E35192015
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch -	

- 1) Available with Housing/Protection cable options E, F, Q, and R only
- Not available with Process fitting/Material options 04, 05, 08, 10, 13, and 14
- 3) Available only with Process Fitting/Material options 00 ... 10, 11, 12, 23 ... 34 and 37 ... 45 (Not available with threaded connections less than 1.5 inch and flanges < DN 50/2 inch)</p>
- 4) Available with Seal option N only

see point level measurement section

- Not available with Process fitting/Material options 00 ... 10, 11, 12, 23 ... 34 and 37 ... 45. (Not available with threaded connections less than 1.5 inch and flanges < DN 50/2 inch)</p>
- 6) Available only with Process fitting/Material options 00 and 01 (options with max temp of 80 °C (176 °F) only available with PN 6 rated threaded connections)
- 7) Available with Version/Material option J only
- 8) Available only with the same diameter probe lengths
- Available with Rod mounted option C00 only (Coax and cable version only)
- 10) Available with Rod mounted options C01, C02 only (rod versions only)
- 11) Available only with Centering weight option B00 (no centering weight option)
- 12) Available with Centering weight options B01 ... B08 only

- <sup>13)</sup> Available only with Housing/Protection cable options E,F, Q, R, T (double chamber options only)
- Available only with Housing/Protection cable options C, D, L, M
- 15) Available with Supplementary electronic option A00 and Local display interface options E00. E01
- 16) Available with Supplementary electronic option A01 and Approval options 0A,0E, and 0P
- <sup>17)</sup> Not Available with Approval options 0B ... 0H 0P, 0Q, 1B, and 1F (not available with Intrinsically Safe and shipping approvals)
- <sup>19)</sup> Not available with Length options 3, 4, 5, R2C and R2D
- <sup>20</sup>) Available only with Seal options C, E, F, J, M, N and Q [second line of defense (with glass seal) for all explosion proof options]
- <sup>21)</sup> Available with Local display interface options E00 and E01
- <sup>22)</sup> Not available with Y02
- <sup>23)</sup> Available with Housing/Protection options C, D, E, F, L, M, Q, R (dust approvals)
- <sup>24)</sup> SIL electronics option 2 available with Approval options 0A, 0E, 0G, 0H, 0L, 0M, 0N, 0P, 0U, 0Q, 0T, 1A, 1B, 1D, 1E, 1F and 1H
- <sup>25)</sup> Available with Process Fitting/Material options 04, 05, 08, 10, 13 ... 45
- <sup>26)</sup> Not available with Process fitting /Material options 04, 05, 08, 10, 13, and 14
- <sup>27)</sup> Not available with Process Fitting/Material options 00 and 01
- <sup>28)</sup> Available with Housing/Protection/Cable options A, B, C, D, E, F, L, M, R, S, T, and U
- <sup>29)</sup> Available with Electronic option 0 only
- 30) Listed Certificates are not available with all configurations, please contact factory for more information
- 31) Not available with Process fitting/Material options 02, 03, 06, 07, 11, and 12 or threaded options below PN 100
- $^{32)}$  Available with supplementary electronic option A00, SIL electronics
- Available with Approvals options 0A,0J,0K,0R,0S,1A,1C,1E,and 1G
- $^{34)}$  Available with housings/protection/cable options E,F,L,M and P
- 35) Available with supplementary electronic option A00
- 36) Available with Local display interface options E00, E01
- <sup>37)</sup> Not available with version/material option K
- <sup>38)</sup> Not available with Seal/Process temperature options A, G, K and Q
- <sup>39)</sup> Not available with Local display interface option E02
- <sup>40)</sup> Available with Housing/protection options D, F, M, R (dust approvals)
- 41) Available with Version/Material A, B, C, D, E and F
- <sup>42)</sup> Only available with Seal/Process temperature N

Note: Please consult manual for further details.

## Guided wave radar transmitters

Selection and Ordering data SITRANS LG260	Article No. 7ML5882-	Order Co	de	Selection and Ordering data SITRANS LG260	Article No. 7ML5882-	Order Code
A guided wave radar sensor for level measurement of solids.				A guided wave radar sensor for level measurement of solids.		
<ul> <li>Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</li> <li>Approvals</li> </ul>		Ш		Thread G 2" (DIN 3852-A) PN 40/316L Flange DN 50 PN 40 Form C, DIN 2501/316L Flange DN 80 PN 40 Form C, DIN 2501/316L	0 6 1 0 1 2	
Ordinary location CE <sup>4</sup> ) <sup>12</sup> ) Shipping approval <sup>9</sup> ) <sup>10</sup> ) ATEX II 1G, 1/2G, 2G Ex ia IIC T6 <sup>4</sup> ) <sup>12</sup> )	0 A 0 B 0 E			Flange DN 100 PN 16 Form C, DIN 2501/316L Flange DN 100 PN 40 Form C, DIN 2501/316L Flange DN 150 PN 16 Form C, DIN 2501/316L	1 3 1 4 1 5	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval <sup>9)</sup> ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T <sup>8)10)12)21)</sup>	0 G 0 H			Flange DN 50 PN 40 EN1092-1 Form B1/316L Flange DN 80 PN 40 EN1092-1 Form B1/316L Flange DN 100 PN16 EN1092-1 Form B1/316L	1 6 1 7 1 8	
ATEX II 1/2G, 2G Ex d ia IIC T6 <sup>1)7)12)</sup> ATEX II 1/2G, 2G Ex d ia IIC + shipping approval <sup>1)7)9)10)</sup>	0 L			Flange 2" 150 lb RF, ANSI B16.5/316L Flange 2" 300 lb RF, ANSI B16.5/316L Flange 3" 150 lb RF, ANSI B16.5/316L	3 0 3 2 3 3	
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 <sup>7/8</sup> )12)21)	0 M			Flange 3" 300 lb RF, ANSI B16.5/316L Flange 4" 150 lb RF, ANSI B16.5/316L Flange 4" 300 lb RF, ANSI B16.5/316L	3 4 3 5 3 6	
ATEX JI 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 <sup>11)12</sup> ) ATEX II 1/2G, 2G Ex d IIC + shipping	0 N 0 Q			Flange 6" 150 lb RF, ANSI B16.5/316L	3 7	
ATEX II 1/2G, 2G Ex d IIC + shipping approval 9/10/11)  ATEX II 1/2G, 2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66 9/11/12/21)  ATEX II 1D, 1/2D, 2D IP6x T <sup>8</sup> )11)12/21)  IEC Ex ia IIC T6 <sup>4</sup> )12)	0 R 0 S 0 T			Electronics Two-wire 4 20mA/HART Four-wire Modbus 16)17)18)19) Two-wire 420mA/HART with SIL qualification 14)15) Four-wire 420mA/HART; 90253V AC; 50/		0 1 2 3
IEC Ex ia IIC T6 + IEC IP6x T tD <sup>8)11)12)21) IEC Ex d ia IIC T6<sup>1)7)12)</sup> IEC Ex d ia IIC T6 + IEC IP6x T tD<sup>7)8)12)21)</sup></sup>	0 U 1 A 1 B			60Hz <sup>1)3)5)</sup> Four-wire 420mA/HART; 9.648V DC; 2042 V AC <sup>1)3)5)</sup> PROFIBUS PA		4 5
IEC Ex d IIC T6 <sup>11</sup> ) <sup>12</sup> ) IEC Ex d IIC T6 + IEC IP6x T tD <sup>8</sup> ) <sup>11</sup> ) <sup>12</sup> ) <sup>21</sup> ) FM (NI) Class I, Div. 2, Groups A, B, C, D <sup>12</sup> ) FM (NI) Class I, Div. 2, Groups A, B, C, D + shipping approval <sup>9</sup> ) <sup>10</sup> )	1 C 1 D 1 F 1 G			Seal/Process temperature  FKM (SHS FPM 70C3 GLT)/-40 +80 °C (-40 +176 °F)  FKM (SHS FPM 70C3 GLT)/-40 +150 °C (-40 +302 °F)	_	A B C
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F <sup>12</sup> FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval <sup>9)10</sup> FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)7)12</sup>	1 H 1 J 1 K			FFKM (Kalrez 6375)/-20 +200 °C (-4 +392 °F) EPDM (A+P 75.5/KW75F)/-40 +80 °C (-40 +176 °F) EPDM (A+P 75.5/KW75F)/-40 +150 °C (-40 +392 °F)		D E
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval 1779) 10)  FM (XP) Class I, Div. 1, Groups A, B, C, D1112)  CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G812)  CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G12)	1 L 1 M 1 N 1 P			Housing/Protection/Cable  Plastic IP66/IP67 M20x1.5/blind stopper  Plastic IP66/IP67 1/2" NPT/blind stopper  Plastic 2-chamber/IP66/IP67/M20x1.5/blind  stopper  Plastic 2-chamber/IP66/IP67 /1/2" NPT/blind  stopper		A B C
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)7)12</sup> ) CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>11)12</sup> )	1 Q 1 R			Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		E F
Probe version/Material Probe exchangeable cable Ø 4 mm (0.16 inch) with gravity weight/316 Probe exchangeable cable Ø 6 mm (0.24 inch) with gravity weight/316 <sup>2)</sup> Probe exchangeable rod Ø 16 mm (0.63 inch) / 316L <sup>2)6)</sup>	A B E			Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper  Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper  Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper  Stainless steel (precision casting) 316L/IP66/IP68/IP68/IP68/IP68/IP68/IP68/IP68		G H J K
Process fitting/Material  Thread G 3/4" (DIN 3852-A) PN 40/316L  Thread 3/4" NPT (ASME B1.20.1) PN 40/316L  Thread G 1" (DIN 3852-A) PN 40/316L  Thread 1" NPT (ASME B1.20.1) PN 40/316L	0 0 0 1 0 2 0 3			IP68 (0.2 bar) 1/2" NPT/blind stopper  Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper  Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper		L M
Thread 1 1/2" (DIN 3852-A) PN 40/316L Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	0 4 0 5			Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		N

## Guided wave radar transmitters

Selection and Ordering data	Article No.	Orde	r Code
SITRANS LG260	7ML5882-		
A guided wave radar sensor for level measurement of solids.			-
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		Р	
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel		Q	ш
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		R	
Stainless steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		S	Ш
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		Т	Ш
Aluminium single chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel- plated		w	Ш
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel- plated		Х	Ш
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated		Y	Ш
Lengths			
Rod ø16 mm/316L			
500 mm (19.69 inch)		0	
501 1 000 mm (19.72 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch)		1 2	Ш.
2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)		3 4 5	Ш
5 001 6 000 mm (196.89 216.53 inch)		6	
Cable lengths ø2 or 4 mm/316			
501 1 000 mm (19.72 39.37 inch)		9	R2E
1 001 5 000 mm (39.41 196.85 inch) 5 001 10 000 mm (196.89 393.70 inch)		9	R2F R2G
10 001 15 000 mm (393.74 590.55 inch)		9	R2H
15 001 20 000 mm (590.59 787.40 inch) 20 001 25 000 mm (787.44 984.25 inch)		9	R2J R2K
25 001 30 000 mm		9	R2L
(984.29 1 181.10 inch) 30 001 35 000 mm		9	R 2 M
(1 181.14 1 377.95 inch) 35 001 40 000 mm (1 377.99 1 574.80 inch)		9	R 2 N
40 001 45 000 mm		9	R 2 P
(1 574.84 1 771.65 inch)			
45 001 50 000 mm (1 771.69 1 968.50 inch)		9	R 2 Q
50 001 55 000 mm (1 968.54 2 165.35 inch)		9	R2R
55 001 60 000 mm (2 165.39 2 362.20 inch)		9	R 2 S

Selection and Ordering data	Article No.	Orde	r Code
SITRANS LG260	7ML5882-		
A guided wave radar sensor for level measurement of solids.			
Cable lengths ø6 mm/316L			
500 mm (19.69 inch)		9	R4A
501 1 000 mm (19.72 39.37 inch)		9	R4B
1 001 5 000 mm (39.41 196.85 inch)		9	R4C
5 001 10 000 mm (196.89 393.70 inch)		9	R 4 D
10 001 15 000 mm (393.74 590.55 inch)		9	R 4 E
15 001 20 000 mm (590.59 787.40 inch)		9	R 4 F
20 001 25 000 mm		9	R4G
(787.44 984.25 inch)			
25 001 30 000 mm (984.29 1 181.10 inch)		9	R 4 H
30 001 35 000 mm		9	R4J
(1 181.14 1 377.95 inch)			
35 001 40 000 mm (1 377.99 1 574.80 inch)		9	R 4 K
40 001 45 000 mm		9	R4L
(1 574.84 1 771.65 inch)			D 4 M
45 001 50 000 mm (1 771.69 1 968.50 inch)		9	R 4 M
50 001 55 000 mm		9	R 4 N
(1 968.54 2 165.35 inch)			
55 001 60 000 mm (2 165.39 2 362.20 inch)		9	R 4 P
(2 100.00 2 002.20 11011)			

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics Without <sup>1)</sup> Additional current output 4 20 mA <sup>1)20)</sup>	A00 A01
Rod mounted Without Rod, applicable for coax or cable probe types only Mounted Not mounted	C00 C01 C02
<b>Local display interface</b> Without Mounted Laterally mounted <sup>1)</sup>	E00 E01 E02
Language of display German English French Dutch Italian	L00 L01 L02 L03 L04
Spanish Portuguese Russian Chinese Japanese	L05 L06 L07 L08 L09
Operating instructions German English French Spanish	M00 M01 M02 M03

## Guided wave radar transmitters

## SITRANS LG series Article No.

		SITE	RANS LG series
Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs (optional)		Spanish	
Please add "-Z" to Article No. and specify Order		4 20 mA/HART - two-wire	PBD:51041094
code(s).	V01	4 20 mA/HART - four-wire	PBD:51041095
Enter the total insertion length in plain text description	Y01	Modbus	PBD:51041096
Cleaning included certificate: oil, grease and silicone free	W01	PROFIBUS PA  Note: Operating instructions should be ordered as a	PBD:51041097
Identification Label (measurement loop) stainless steel	Y17	separate line on the order.	
Identification Label (measurement loop) Foil	Y18	This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) <sup>13)</sup>	D07	Accessories	
3.1-Inspection Certificate for instrument with test data (EN 10204) <sup>13)</sup>	C25	SITRANS LG, GWR sensor Display Module	A5E34143449
, , ,	C15	SITRANS LG, USB communicator	A5E35192015
2.2-Factory certificate for material (EN 10204) <sup>13)</sup> Quality and test plan <sup>13)</sup>		SITRANS RD100, loop powered display -	7ML5741
	C26	see Chapter 7	7141 57 40
Dye penetration test + 3.1 certificate/instrument <sup>13)</sup> X-ray test + 3.1 certificate/instrument <sup>13)</sup>	C13	SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
Positive material identification test + 3.1 certificate/	C14	SITRANS RD300, dual line display with totalizer	7ML5744
instrument <sup>13)</sup> Roughness test + 3.1 certificate/instrument <sup>13)</sup>	C18	and linearization curve and Modbus conversion - see Chapter 7	
Pressure test + 3.1 certificate/instrument <sup>13)</sup>	C16	SITRANS RD500 web, universal remote monitoring	7ML5750
Helium leak test + 3.1 certificate/instrument <sup>13)</sup>	C32	solution for instrumentation - see Chapter 7	
	C60	For applicable back up point level switch -	
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument <sup>13)</sup>		see point level measurement section  1) Available only with Housing/Protection/Cable Options	CHND
Pressure test according to Norsok + 3.1 certificate/instrument (13)	C61	2) Not available with Process/Fitting/Material options 00,	, 01, 02, and 03
5 point calibration certificate + 3.1 certificate/instrument <sup>13)</sup>	C62	Available with Supplementary electronic option A00 a interface options E00, E01      Available with Supplementary electronic option A01      Available with Supplementary electronic option A01	and Local display
Operating Instructions	Article No.	5) Not Available with Approval options 0B 0H 0L, 0Q,	1B, 1F, 1G, 1J, 1L
German		(not available with Intrinsically Safe and shipping app  6) Available with Rod Mounted options C01 and C02	orovals)
4 20 mA/HART - two-wire	PBD:51041020	7) Available with Local display interface options E00 and 8) Available with Housing Protection options E, F, G, H, C	d E01
4 20 mA/HART - four-wire	PBD:51041021	9) Not available with Housing/Protection/Cable options I	_, M, and T
Modbus	PBD:51041022	10) Available with Electronic option 0 only 11) Available with Seal/Process temperature option C only	v
PROFIBUS PA	PBD:51041023	<ul> <li>Available with Version/Material option E only</li> <li>Listed Certificates are not available with all configurat</li> </ul>	
Note: Operating instructions should be ordered as a separate line on the order.		factory for more information  14) SIL electronics option 2 available with Approval optio	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.		ON, OQ, OR, OS, OT, OU, 1C, 1D, 1F, 1H, 1M, 1N, 1P, at 15) Available with supplementary electronic option AOO, 3 16) Available with Approvals options OA, OJ, OK, OR, OS, 1	nd 1R SIL electronics A.1C.1E and 1G
English		17) Available with housings/protection/cable options E, F, 18) Available with supplementary electronic option A00	L, M and P
4 20 mA/HART - two-wire	PBD:51041057	19) Available with Local display interface options EOO EO	)1
4 20 mA/HART - four-wire	PBD:51041058	20) Not available with Local display interface option E02 21) Available with Housing Protection F, H, P and K	
Modbus	PBD:51041059	Note: Please consult manual for further details.	
PROFIBUS PA	PBD:51041060		
Note: Operating instructions should be ordered as a separate line on the order.			
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.			
French			
4 20 mA/HART - two-wire	PBD:51041131		
4 20 mA/HART - four-wire	PBD:51041132		
Modbus	PBD:51041133		
PROFIBUS PA	PBD:51041134		
Note: Operating instructions should be ordered as a			
separate line on the order.			
This daying is shipped with the Ciamana Milltranias			

This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions

library.

## Guided wave radar transmitters

STRANS LG series	
Selection and Ordering data	Article No. Order Code
SITRANS LG270	7ML5883-
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Approvals	
Ordinary location CE <sup>3)</sup> Shipping approval <sup>17)18)19)</sup>	0 A 0 B
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 <sup>3)</sup>	0 E
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval 17)18)19)	0 G
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x <sup>16)28)</sup>	0 H
ATEX II 1/2G, 2G Ex d ia IIC T6 <sup>1)10)14)</sup> ATEX II 1/2G, 2G Ex d ia IIC + ship <sup>1)10)14)17)18)19)</sup>	0 J 0 L
ship <sup>1)10)14</sup> )17)18)19) ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x <sup>10</sup> )14)16)28)	ом
ATEX II 1/2G, 2G Ex d IIC T6 <sup>11)</sup>	0 N
ATEX II 1/2G, 2G Ex d IIC + ship approval 17)18)19)	0 Q
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x <sup>11)16)28)</sup>	0 R
ATEX II 1D, 1/2D, 2D IP6x T <sup>16)28)</sup> IEC Ex ia IIC T6 <sup>3)</sup>	0 S 0 T
IEC Ex ia IIC T6 + IEC IP6x T tD <sup>16)28)</sup>	o U
IEC Ex d ia IIC T6 <sup>1)10)14)</sup>	1 A
IEC Ex d ia IIC T6 + IEC IP6x T tD <sup>10)14)16)28)</sup>	1 B
IEC Ex d IIC T6 <sup>11)</sup>	1 C
IEC Ex d IIC T6 + IEC IP6x T tD <sup>11)16)28)</sup>	1 D
FM (NI) Class I, Div. 2, Groups A, B, C, D	1 F
FM (NI) Class I. Div. 2, Groups A, B, C, D + ship approval 17)18)19)	1 G
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F	1 H
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + ship approval (7)18)19)	1 J
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)10)14)</sup>	1 K
FM (XP-IS) Class I, II, III, Div. 1, Groups A. B. C, D, E, F, G + shipping approval (1)10)17)18)19)	1L
FM (XP) Class I, Div. 1, Groups A, B, C, D	1 M
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G <sup>16)</sup>	1 N
CSA (IS) Class I, II, III, Div. 1, Groups A, B,	1 P
C, D, E, F, G CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>1)10)14)</sup>	1 Q
B, C, D, E, F, G (1916) (1) CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G <sup>11)</sup>	1 R
Version/Material	
Probe exchangeable cable ø 2 mm	A
(0.08 inch) with gravity weight/316L4)/)	
Probe exchangeable cable ø2 mm (0.08 inch) center weight/316L 5)7)	В
Probe exchangeable cable ø4 mm (0.16 inch) with gravity weight/316L <sup>4)7)</sup>	С
Probe exchangeable cable ø4 mm (0.16 inch) with center weight/316L <sup>5)7)</sup>	D
Probe exchangeable rod ø 16 mm (0.63 inch) /316L <sup>4)7)9)</sup>	E
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L <sup>4)7)</sup>	F
Probe coax version ø 42.2 mm (1.66 inch); multiple hole; reference distances/ 316L <sup>4</sup> /7)13)30)	G
S IOL '''''	

Selection and Ordering data	Article No. Order Code
SITRANS LG270	7ML5883-
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	*****
Process fitting/Material	
Thread G 1 1/2" (DIN 3852-A) PN 400/316L Thread 1 1/2" NPT (ASME B1.20.1) PN 400/ 316L	0 0 0 1
Flange DN 50 PN 40 Form C, DIN 2501/316L	1 0
Flange DN 50 PN 40 form V13, DIN 2513/316L Flange DN 65 PN 64 Form V13, DIN 2501/ 316L	11112
Flange DN 80 PN 40 Form C, DIN 2501/316L	1 3
Flange DN 80 PN 40 Form V13, DIN 2501/ 316L	1 4
Flange DN 80 PN 100 Form L, DIN 2501/316L Flange DN 100 PN 16 Form C, DIN 2501/316L	1 5 1 6
Flange DN 100 PN 16 Form C, DIN 2501/316L Flange DN 100 PN 40 Form C, DIN 2501/316L Flange DN 100 PN 40 Form V13, DIN 2513/ 816L	1 7 1 8 2 0
Flange DN 150 PN 16 Form C, DIN 2501/316L Flange DN 50 PN 40 EN1092-1 Form B1/316L Flange DN 100 PN 160 GOST 12815-80.7/ 316L	2 1 2 2 2 3
Flange DN 80 PN 160 Form C, DIN 2501/316L Flange DN 80 PN 250 Form L, DIN 2501/316L Flange DN 50 PN 160, EN1092-1 Form B1/ 816L	6 0 6 1 6 2
Flange DN 50 PN 160, EN1092-1 Form B2/ 316L	6 3
Flange DN 50 PN 320, EN1092-1 Form B1/ 316L	6 4
Flange DN 65 PN 250, EN1092-1 Form B1/ 316L	6 5
Flange DN 100 PN 160, EN1092-1 Form B2/ 316L	6 6
Flange 2" 150 lb RF, ANSI B16.5/316L Flange 2" 300 lb RF, ANSI B16.5/316L	3 0 3 1
Flange 2" 600 lb RF, ANSI B16.5/316L Flange 2" 1 500 lb RF, ANSI B16.5/316L	3 2 3 3
Flange 3" 150 lb RF, ANSI B16.5/316L	3 4
Flange 3" 300 lb RF, ANSI B16.5/316L Flange 3" 600 lb RF, ANSI B16.5/316L Flange 3" 900 lb RF, ANSI B16.5/316L	3 5 3 6 3 7
Flange 3" 2 500 lb RF, ANSI B16.5/316L	3 8
Flange 3 1/2" 600 lb RF, ANSI B16.5/316L Flange 4" 150 lb RF, ANSI B16.5/316L	4 0 4 1
Flange 4" 300 lb RF, ANSI B16.5/316L Flange 4" 600 lb RF, ANSI B16.5/316L Flange 6" 150 lb RF, ANSI B16.5/316L	4 2 4 3 4 4
Flange 6" 300 lb RF, ANSI B16.5/316L Flange 6" 600 lb RF, ANSI B16.5/316L Flange 2"150 lb Fisher special return/316L	4 5 4 6 4 7
Flange 2" 900 lb RF, ANSI B16.5/316L Flange 3" 1 500 lb RF, ANSI B16.5/316L Flange 4" 900 lb RF, ANSI B16.5/316L	5 0 5 1 5 2
Flange 4" 1 500 lb RF, ANSI B16.5/316L Flange 4" 2 500 lb RJF, ANSI B16.5/316L Flange 4" 1500 lb RJF, ASME B16.5/316L	5 3 5 4 5 5

## Guided wave radar transmitters

Selection and Ordering data	Article No. Order Code
SITRANS LG270	7ML5883-
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	
Electronics Two-wire 4 20mA/HART Four-wire Modbus <sup>23</sup> ) <sup>24</sup> ) <sup>25</sup> ) <sup>26</sup> ) Two-wire 4 20mA/HART with SIL qualification <sup>21</sup> ) <sup>22</sup> ) Four-wire 4 20mA/HART; 90 253V AC; 50/60Hz <sup>1</sup> ) <sup>2</sup> ) <sup>6</sup> ) Four-wire 4 20mA/HART; 9.6 48V DC; 20 42 V AC <sup>1</sup> ) <sup>2</sup> ) <sup>6</sup> ) PROFIBUS PA	0 1 2 3 4
Seal/Second line of defense/	. 3
Process temperature Ceramic-graphite/with glass seal/ -196 +280 °C (-321 +536 °F) Ceramic-graphite /with glass seal/ -196 +450 °C (-321 +842 °F)	A B
Housing/Protection/Cable	
Plastic IP66/IP67 M20x1.5/blind stopper Plastic IP66/IP67 1/2" NPT/blind stopper Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind	A B C
stopper Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind	D
stopper Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	E F
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	L
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	M N
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	P
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	Q
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	R
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel	S
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel	, T
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel	V
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel	v w
Aluminium single chamber / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	
Aluminium double chamber / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	X
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	Y

Selection and Ordering data	Article No.	Order	Code
SITRANS LG270	7ML5883-		
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		-	П
Lengths			
300 mm (11.81 inch) <sup>15)</sup>			
500 mm (19.69 inch) <sup>15)</sup>		0	
501 1 000 mm (19.72 39.37 inch) <sup>15)</sup> 1 001 2 000 mm (39.41 78.74 inch) <sup>15)</sup> 2 001 3 000 mm (78.78 118.11 inch) <sup>15)</sup>		1 2 3	
3 001 4 000 mm (118.15 157.48 inch) <sup>15)</sup>		4	
4 001 5 000 mm (157.52 196.85 inch) <sup>15)</sup>		5	
5 001 6 000 mm (196.89 216.53 inch) <sup>15)</sup>		6	
300 mm (11.81 inch) <sup>15)</sup>		7	
Cable lengths ø2 or 4 mm/316L 501 1 000 mm (19.72 39.37 inch)		9	R2E
1 000 5 000 mm (39.37 196.85 inch)		9	R 2 F
5 001 10 000 mm (196.89 393.70 inch)		9	R 2 G
10 001 15 000 mm (393.74 590.55 inch)		9	R 2 H
15 001 20 000 mm (590.59 787.40 inch)		9	R 2 J
20 001 25 000 mm (787.44 984.25 inch)		9	R2K
25 001 30 000 mm (984.29 1 181.10 inch)		9	R 2 L
30 001 35 000 mm (1 181.14 1 377.95 inch)		9	R 2 M
35 001 40 000 mm (1 377.99 1 574.80 inch)		9	R 2 N
40 001 45 000 mm		9	R 2 P
(1 574.84 1 771.65 inch) 45 001 50 000 mm (1 771.69 1 968.50 inch)		9	R 2 Q
50 001 55 000 mm		9	R 2 R
(1 968.54 2 165.35 inch) 55 001 60 000 mm		9	R 2 S
(2 165.39 2 362.20 inch)			
Coax ø42.2 mm/316L 300 1 000 mm (11.81 39.37 inch) <sup>15)</sup>		9	R3G
1 001 2 000 mm (39.41 78.74 inch) <sup>15)30)</sup>		9	R3H
2 001 3 000 mm (78.78 118.11 inch) <sup>15)</sup>		9	R3J
3 001 4 000 mm (118.15 157.48 inch) <sup>15)</sup>		9	R 3 K
4 001 5 000 mm		9	R3L
(157.52 196.85 inch) <sup>15)</sup> 5 001 6 000 mm		9	R3M
(196.89 236.22 inch) <sup>15)</sup>			

## Guided wave radar transmitters

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 20 mA <sup>1)27)</sup>	A01
Dimensions centering weight (diameter/height)	
Without	B00
ø40/30 mm	B01
ø45/30 mm (for 2 inch tubes)	B02
ø75/30 mm (for 3 inch tubes)	B03
ø95/30 mm (for 4 inch tubes)	B04
ø1.57/1.18 inch (for 2 inch schedule 160)	B05
· ·	B06
ø1.77/ 1.18 inch (for 2 inch schedule 40/80)	B07
ø2.95/1.18 inch (for 3 inch schedule 10/40) ø3.74/ 1.18 inch (for 4 inch schedule 80)	B07 B08
<u></u>	
Rod mounted  Without Rod, applicable for coax or cable probe types only <sup>8)</sup>	C00
Mounted	C01
Not mounted	C02
	- 002
Local display interface	E00
Without	
Mounted	E01
Laterally mounted <sup>1)</sup>	E02
Language of display	
German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03
Russian	L07
Chinese	L08
Japanese	L09

Selection and Ordering data	Order code
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part [to a maximum of 100 mm (4 inch) (cable version only)]	Y02
Cleaning included certificate: oil, grease and silicone free	W01
Identification Label (measurement loop) stainless steel	Y17
Identification Label (measurement loop) Foil	Y18
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175) <sup>20)</sup>	D07
3.1-Inspection Certificate for instrument with test data (EN 10204) <sup>20)</sup>	C25
2.2-Factory certificate for material (EN 10204) <sup>20)</sup>	C15
Quality and test plan <sup>20)</sup>	C26
Dye penetration test + 3.1 certificate/instrument <sup>20)</sup>	C13
X-ray test + 3.1 certificate/instrument <sup>20)</sup>	C14
Positive material identification test + 3.1 certificate/instrument <sup>20)</sup>	C16
Roughness test + 3.1 certificate/instrument <sup>20)</sup>	C18
Pressure test + 3.1 certificate/instrument <sup>20)</sup>	C31
Helium leak test + 3.1 certificate/instrument <sup>20)</sup>	C32
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument <sup>20</sup> )	C60
Pressure test according to Norsok + 3.1 certificate/instrument <sup>20)</sup>	C61
5 point calibration certificate + 3.1 certificate/instrument <sup>20)29)</sup>	C62
Additional Operating Instructions	Article No.
German	
4 20 mA/HART - two-wire	PBD:51041025
4 20 mA/HART - two-wire coax probe	PBD:51041026
4 20 mA/HART - four-wire	PBD:51041027
4 20 mA/HART - four-wire coax probe	PBD:51041028
Modbus	PBD:51041029
Modbus, Coax probe	PBD:51041030
PROFIBUS PA	PBD:51041031
PROFIBUS PA, Coax probe	PBD:51041032
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 20 mA/HART - two-wire	PBD:51041062
4 20 mA/HART - two-wire coax probe	PBD:51041063
4 20 mA/HART - four-wire	PBD:51041064
4 20 mA/HART - four-wire coax probe	PBD:51041065
Modbus	PBD:51041066
Modbus, Coax probe	PBD:51041067
PROFIBUS PA	PBD:51041068
PROFIBUS PA, Coax probe	PBD:51041069
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

#### Guided wave radar transmitters

#### **SITRANS LG series**

Selection and Ordering data	Article No.
French	
4 20 mA/HART - two-wire	PBD:51041136
4 20 mA/HART - two-wire coax probe	PBD:51041137
4 20 mA/HART - four-wire	PBD:51041138
4 20 mA/HART - four-wire coax probe	PBD:51041139
Modbus	PBD:51041140
Modbus, Coax probe	PBD:51041141
PROFIBUS PA	PBD:51041142
PROFIBUS PA, Coax probe	PBD:51041143
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Spanish	
4 20 mA/HART - two-wire	PBD:51041099
4 20 mA/HART - two-wire coax probe	PBD:51041100
4 20 mA/HART - four-wire	PBD:51041101
4 20 mA/HART - four-wire coax probe	PBD:51041102
Modbus	PBD:51041103
Modbus, Coax probe	PBD:51041104
PROFIBUS PA	PBD:51041105
PROFIBUS PA, Coax probe	PBD:51041105
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Accessories	
SITRANS LG, GWR sensor Display Module	A5E34143449
SITRANS LG, USB communicator	A5E35192015
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

- 1) Available with Housing/Protection/Cable options E, F, Q, R, and T
- 2) Available with Supplementary electronic option A00 and Local display

- Available with Supplementary electronic option Ao0 and Local display interface options E00, E01

  Available with Supplementary electronics A01

  Available with Centering weight option B00 only

  Available with Centering weight options B01...B08 only

  Available with Approval options 0A, 0B, 0J, 0K, 0N, 0R, OS,1A, 1C, 1E, 1F, 6)

- Available with Your State of S

- 23) Available with Approval options 0A, 0H, 0K, 0R, 0S, 0U, 1A, 1C, 1D, 1E, 1F, 23) Available with Approval options 0A, 0H, 0K, 0R, 0S, 0U, 1A, 1C, 1E
  1H, 1N, 1P, and 1R
  24) Available with housings/protection/cable options E, F, L, M and P
  25) Available with supplementary electronic option A00
  26) Available with Local display interface options E00, E01
  27) Not available with Local display interface option E02
  28) Available with Housing protection options D, F, M, and R
  29) Available with Version/Material A, B, C, D, and E
  30) Accuracy is application dependent, please consult factory

Note: Please consult manual for further details.

## Guided wave radar transmitters

SITRANS LG Replacement Probes  7 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Instrument LG240 <sup>4</sup> 15) LG256 <sup>6</sup> ) LG256 <sup>6</sup> ) LG256 <sup>7</sup> ) LG270 <sup>9</sup> 110)  7 Probe Type  Exchangeable cable Ø 2 mm with gravity weight/316 <sup>7</sup> ) Exchangeable cable Ø2 mm center weight/316 <sup>8</sup> ) Exchangeable cable Ø4 mm without weight/316 <sup>8</sup> ) Exchangeable cable Ø4 mm with gravity weight/316 <sup>8</sup> ) Exchangeable cable Ø 4 mm with center weight/316 <sup>8</sup> ) Exchangeable cable Ø 6 mm with gravity weight/316 <sup>8</sup> ) Exchangeable cable Ø 6 mm with gravity weight/316 <sup>8</sup> ) Exchangeable cable Ø 6 mm with gravity weight/316 <sup>8</sup> ) Exchangeable rod Ø 8 mm/316L <sup>1</sup> ) Exchangeable rod Ø 8 mm/316L <sup>1</sup> ) AP Exchangeable rod Ø 12 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 12 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 16 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 316L <sup>1</sup> ) Exchangeable rod Ø 10 mm / 31	STIRANS LG series	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Instrument LG240 <sup>41/5)</sup> LG250 <sup>6)</sup> LG250 <sup>6)</sup> LG250 <sup>7)</sup> LG270 <sup>9110)</sup> Robertype Exchangeable cable ø 2 mm with gravity weight/316 <sup>1)</sup> Exchangeable cable ø 2 mm center weight/316 <sup>2)</sup> Exchangeable cable ø 4 mm without weight/316 <sup>3)</sup> Exchangeable cable ø 4 mm with gravity weight/316 <sup>1)</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>3)</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>3)</sup> Exchangeable cod ø 8 mm/ 316L <sup>1)</sup> Exchangeable rod ø 8 mm/ 316L <sup>1)</sup> Exchangeable rod ø 8 mm/ 1.4435 (acc. to Basle Standard) <sup>1)</sup> Exchangeable rod ø 16 mm / 316L <sup>1)</sup> Ex	Selection and Ordering data	Article No.
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.  Instrument  IG240 <sup>4195</sup> IG250 <sup>61</sup> IG250 <sup>61</sup> IG260 <sup>77</sup> IG270 <sup>9110)</sup> Probe Type  Exchangeable cable ø 2 mm with gravity weight/3 for 1 for 1 for 1 for 1 for 1 for 1 for 2 inch rubes)  Exchangeable cable ø 4 mm without weight/316 <sup>91</sup> Exchangeable cable ø 4 mm with gravity weight/316 <sup>91</sup> Exchangeable cable ø 4 mm with gravity weight/316 <sup>91</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>91</sup> Exchangeable rod ø 8 mm/1.4435 (acc. to Basie Standard) 1 AP  Exchangeable rod ø 8 mm/1.4435 (acc. to Basie Standard) 1 AP  Exchangeable rod ø 12 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 12 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 316L 1 AP  Exchangeable rod ø 10 mm / 316L 1 AP  Exchangeable rod ø 16 mm / 31	SITRANS LG Replacement Probes	7ML5841-
Instrument   L(2404/15)   D   L(2506)   D   L(2506)   D   L(2506)   D   L(2506)   D   D   L(2506)   D   D   D   D   D   D   D   D   D		0
LG240 <sup>(4)5)</sup> LG250 <sup>(6)</sup> 1 (LG250 <sup>(6)</sup> ) 2 LG250 <sup>(6)</sup> 2 LG260 <sup>(7)</sup> 2 2 LG270 <sup>(9)10)</sup> 3 Probe Type  Exchangeable cable ø 2 mm with gravity weight/316 <sup>(1)</sup> Exchangeable cable ø 4 mm without weight/316 <sup>(1)</sup> AC 316 <sup>(1)</sup> AE Exchangeable cable ø 4 mm with gravity weight/316 <sup>(1)</sup> Exchangeable cable ø 4 mm with gravity weight/316 <sup>(1)</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>(1)</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>(1)</sup> AP Exchangeable cable ø 6 mm with gravity weight/316 <sup>(1)</sup> AP Exchangeable rod ø 8 mm / 316L <sup>(1)</sup> AP Exchangeable rod ø 12 mm / 316L <sup>(1)</sup> AV Exchangeable rod ø 12 mm / 316L <sup>(1)</sup> AW Process fitting  Thread to 1 1/2 inch  Thread to 1 1/2 inch  Thread to 2 inch  Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without widon mm (for 3 inch tubes) and 57 mm/30 mm (for 2 inch tubes) and 57 mm/30 mm (for 4 inch tubes) and 57 mm/30 mm (for 4 inch tubes) and 57 mm/30 mm (for 4 inch tubes) and 57 mc/1.18 inch (for 2 inch Schedule 160) and 57 mc/1.18 inch (for 2 inch Schedule 10/40) and 37.4 inch/1.18 inch (for 4 inch Schedule 10/40) and 37.4 inch/1.18 inch (for 4 inch Schedule 80)  Certificates  Without 0  2.2 Material certificate 1  3.1 Material certificate 2  Lengths  Rod Ø mm  300 1 000 mm (11.81 39.37 inch) AA  1 001 2 000 mm (39.41 78.74 inch) AB  2 001 3 000 mm (78.78 118.11 inch) AC  3 001 4 000 mm (118.15 157.48 inch) AC  3 001 4 000 mm (157.52 196.85 inch) AE		
LG2506  LG2607  LG2709100   3	Instrument	
LG267  LG2709 10  Probe Type		
Probe Type Exchangeable cable ø 2 mm with gravity weight/1619 Exchangeable cable ø 2 mm with gravity weight/1619 Exchangeable cable ø 4 mm without weight/1619 Exchangeable cable ø 4 mm with gravity weight/1619 Exchangeable cable ø 4 mm with center weight/1619 Exchangeable cable ø 6 mm with gravity weight/1619 Exchangeable rod ø 8 mm/ 316L1) Exchangeable rod ø 12 mm / 316L1) Exchangeable rod ø 16 mm / 316L1) Exchangeable rod ø 10 mm / 316L1) Exchangeable rod ø 8 mm/ 316L1) Exchangeable rod ø 8 mm / 316L1) Exchangeable rod ø 8 mm / 316L1) Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Exchangeable rod ø 8 mm / 316L1)  Dibrersion of 1 mm / 316L1)  Di		
Exchangeable cable ø 2 mm with gravity weight/316¹ AC 316²)  Exchangeable cable ø 2 mm center weight/316¹ AC 316²)  Exchangeable cable ø 4 mm without weight/316¹ AE Exchangeable cable ø 4 mm with gravity weight/316¹ AE Exchangeable cable ø 4 mm with center weight/316¹ AF Exchangeable cable ø 6 mm with gravity weight/316¹ AF Exchangeable rod ø 8 mm / 316L¹)  Exchangeable rod ø 8 mm / 316L¹)  Exchangeable rod ø 12 mm / 316L¹)  Exchangeable rod ø 16 mm / 316L¹)  Exchangeable rod ø 16 mm / 316L¹)  Exchangeable rod ø 17 mm / 316L¹)  Exchangeable rod ø 18 mm / 316L¹)  Exchangeable rod ø 10 mm / 316L¹)  AU  Process fitting  Thread to 1 1/2 inch  Thread to 2 inch  Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  ø40 mm/ 30 mm (for 3 inch tubes)  ø55 mm/ 30 mm (for 3 inch tubes)  ø55 mm/ 30 mm (for 4 inch buben)  Exchangeable rod ø 8 mm / 316L¹)  8  Certificates  Without  2.2 Material certificate  3.1 Material certificate  2.2 Material certificate  3.1 Material certificate  2.2 Lengths  Rod ø8 mm.  300 1 000 mm (11.81 39.37 inch)  AA  AB  AC  3 001 4 000 mm (17.57.52 196.85 inch)  AE	LG270 <sup>9)10)</sup>	
weight/316 <sup>17</sup> Exchangeable cable ø2 mm center weight/ 316 <sup>13</sup> Exchangeable cable ø4 mm without weight/ 316 <sup>13</sup> Exchangeable cable ø4 mm with gravity weight/316 <sup>13</sup> Exchangeable cable ø 4 mm with center weight/316 <sup>13</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>13</sup> Exchangeable rod ø8 mm / 316L <sup>17</sup> Exchangeable rod ø 8 mm / 316L <sup>17</sup> Exchangeable rod ø 8 mm / 316L <sup>17</sup> Exchangeable rod ø 12 mm / 316L <sup>17</sup> Exchangeable rod ø 16 mm / 316L <sup>17</sup> AU Exchangeable rod ø 16 mm / 316L <sup>17</sup> Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>17</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø 10 mm / 316L <sup>1</sup> AU  Exchangeable rod ø	Probe Type	
Exchangeable cable ø2 mm center weight/ 316²)  Exchangeable cable ø4 mm without weight/ 316¹)  Exchangeable cable ø4 mm with gravity weight/316¹¹)  Exchangeable cable ø 4 mm with center weight/316¹¹)  Exchangeable cable ø 6 mm with gravity weight/316¹¹⁰  Exchangeable rod ø8 mm / 316L¹¹)  Exchangeable rod ø 8 mm / 316L¹¹)  Exchangeable rod ø 12 mm / 316L¹¹)  Exchangeable rod ø 12 mm / 316L¹¹)  Exchangeable rod ø 12 mm / 316L¹¹)  Exchangeable rod ø 16 mm / 316L¹¹)  Exchangeable rod ø 16 mm / 316L¹¹)  AU  Exchangeable rod ø 16 mm / 316L¹¹)  AU  Exchangeable rod ø 16 mm / 316L¹¹)  Exchangeable rod ø 16 mm / 316L¹¹)  AU  Exchangeable rod ø 16 mm / 316L¹¹)  Exchangeable rod ø 16 mm / 316L¹¹)  AU  Exchangeable rod ø 18 mm / 316L¹¹)  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø 8 mm / 316L¹¹  AU  AU  Exchangeable rod ø	Exchangeable cable ø 2 mm with gravity	AA
Exchangeable cable ø4 mm without weight/ 316 11   Exchangeable cable ø4 mm with gravity weight/316 11   Exchangeable cable ø 4 mm with center weight/316 11   Exchangeable cable ø 6 mm with gravity weight/316 11   Exchangeable rod ø8 mm / 316L 11   Exchangeable rod ø 8 mm / 316L 11   Exchangeable rod ø 8 mm / 316L 11   Exchangeable rod ø 12 mm / 316L 11   Exchangeable rod ø 12 mm / 316L 11   Exchangeable rod ø 16 mm / 316L 11   Exchangeable rod ø 10   Exchangeable rod ø 10 mm / 316L 11   Exchangeable rod ø 10   Exchangeable rod ø 10   Exchangeable rod ø 10 mm / 316L 11   Exchangeable rod ø 10   Excha	Exchangeable cable ø2 mm center weight/	AC
Exchangeable cable ø4 mm with gravity weight/316 <sup>19</sup> Exchangeable cable ø 4 mm with center weight/316 <sup>20</sup> Exchangeable cable ø 6 mm with gravity weight/316 <sup>21</sup> Exchangeable rod ø8 mm / 316L <sup>11</sup> Exchangeable rod ø 8 mm / 316L <sup>11</sup> Exchangeable rod ø 12 mm / 316L <sup>11</sup> Exchangeable rod ø 12 mm / 316L <sup>11</sup> Exchangeable rod ø 12 mm / 316L <sup>11</sup> AW  Process fitting  Thread to 1 1/2 inch  Thread to 2 inch  Flange less than DN 50 or 2 inch  Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without	Exchangeable cable ø4 mm without weight/	A D
Exchangeable cable ø 4 mm with center weight/316 <sup>2</sup> )  Exchangeable cable ø 6 mm with gravity weight/316 <sup>1</sup> )  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  Exchangeable rod ø 12 mm / 316L <sup>1</sup> )  Exchangeable rod ø 12 mm / 316L <sup>1</sup> )  Exchangeable rod ø 12 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 18 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 18 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 8 mm / 1  AU  Exchangeable rod ø 8 mm / 1  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Exchangeable rod ø 16 mm / 316L <sup>1</sup> )  AU  Excha	Exchangeable cable ø4 mm with gravity	AE
Exchangeable cable Ø 6 mm with gravity weight/316 <sup>198</sup>	Exchangeable cable ø 4 mm with center weight/316 <sup>2)</sup>	AG
Exchangeable rod ø 8 mm/1.4435 (acc. to Basle Standard) <sup>1)</sup> Exchangeable rod ø12 mm / 316L <sup>1)</sup> Exchangeable rod ø16 mm / 316L <sup>1)</sup> Process fitting  Thread to 1 1/2 inch Thread to 2 inch Flange less than DN 50 or 2 inch Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  ø40 mm/ 30 mm  ø45 mm/ 30 mm (for 3 inch tubes)  ø75 mm/ 30 mm (for 4 inch tubes)  ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  2.1 Material certificate  Lengths Rod ø8 mm  300 1 000 mm (11.81 39.37 inch) AA  AB  AC  3 001 4 000 mm (118.15 157.48 inch) AC  30 01 4 000 mm (157.52 196.85 inch)  AE	Exchangeable cable ø 6 mm with gravity weight/316 <sup>1)8)</sup>	
Exchangeable rod ø12 mm / 316L 1) Exchangeable rod ø16 mm / 316L 1) Exchangeable rod ø16 mm / 316L 1)  Process fitting Thread to 1 1/2 inch Thread to 2 inch Flange less than DN 50 or 2 inch Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight Without ø40 mm/ 30 mm ø45 mm/ 30 mm (for 3 inch tubes) ø75 mm/ 30 mm (for 4 inch tubes) ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160) ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80) ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40) ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates Without 2.2 Material certificate 3.1 Material certificate 3.1 Material certificate 2. Lengths Rod ø8 mm 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  AB	Exchangeable rod ø 8 mm/1.4435 (acc. to	
Process fitting Thread to 1 1/2 inch Thread to 2 inch Flange less than DN 50 or 2 inch Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  Ø40 mm/ 30 mm  Ø45 mm/ 30 mm (for 2 inch tubes)  Ø575 mm/ 30 mm (for 3 inch tubes)  Ø585 mm/ 30 mm (for 4 inch tubes)  Ø595 mm/ 30 mm (for 4 inch tubes)  Ø5 finch/ 1.18 inch  (for 2 inch Schedule 160)  Ø1.77 inch/ 1.18 inch  (for 2 inch Schedule 40/80)  Ø2.95 inch/ 1.18 inch  (for 3 inch Schedule 10/40)  Ø3.74 inch/ 1.18 inch  (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  1 1  3 00 1 000 mm (11.81 39.37 inch)  1 1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  AE	Exchangeable rod ø12 mm / 316L <sup>1)</sup>	
Thread to 1 1/2 inch Thread to 2 inch Thread to 2 inch Thread to 2 inch Flange less than DN 50 or 2 inch Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  ø40 mm/ 30 mm  ø45 mm/ 30 mm (for 2 inch tubes)  ø95 mm/ 30 mm (for 4 inch tubes)  ø95 mm/ 30 mm (for 4 inch tubes)  ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  1 3.1 Material certificate  Lengths Rod ø8 mm. 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  AE		
Thread to 2 inch Flange less than DN 50 or 2 inch Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  Ø40 mm/ 30 mm  Ø45 mm/ 30 mm (for 2 inch tubes)  Ø75 mm/ 30 mm (for 3 inch tubes)  Ø85 mm/ 30 mm (for 4 inch tubes)  Ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  Ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  Ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  Ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  2 Lengths  Rod Ø8 mm  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  AE	•	0
Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  ø40 mm/ 30 mm  ø45 mm/ 30 mm (for 2 inch tubes)  ø75 mm/ 30 mm (for 3 inch tubes)  ø95 mm/ 30 mm (for 4 inch tubes)  ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  Lengths  Rod ø8 mm  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)	Thread to 1 1/2 inch	1
Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)  Dimension centering weight  Without  ø40 mm/ 30 mm  ø45 mm/ 30 mm (for 2 inch tubes)  ø75 mm/ 30 mm (for 3 inch tubes)  ø95 mm/ 30 mm (for 4 inch tubes)  ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  Lengths  Rod ø8 mm  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)	Flange less than DN 50 or 2 inch	2
Dimension centering weight  Without  Ø40 mm/ 30 mm  Ø45 mm/ 30 mm (for 2 inch tubes)  Ø75 mm/ 30 mm (for 3 inch tubes)  Ø95 mm/ 30 mm (for 4 inch tubes)  Ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)  Ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  Ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  Ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  1  3.1 Material certificate  Lengths  Rod Ø8 mm.  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  A E	3	
Without ø40 mm/ 30 mm ø45 mm/ 30 mm (for 2 inch tubes) ø75 mm/ 30 mm (for 3 inch tubes) ø95 mm/ 30 mm (for 4 inch tubes) ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160) ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80) ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40) ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates Without 2.2 Material certificate 3.1 Material certificate  Lengths Rod ø8 mm 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  A I 001 5 000 mm (157.52 196.85 inch)	hygienic fitting (not for safety in gold 25 x 46 mm)	
### 240 mm/ 30 mm ### 30 mm (for 2 inch tubes) ### 30 mm (for 3 inch tubes) ### 30 mm (for 4 inch tubes) ### 31.57 inch/ 1.18 inch (for 2 inch Schedule 160) ### 31.77 inch/ 1.18 inch (for 3 inch Schedule 40/80) ### 32.49 inch/ 1.18 inch (for 4 inch Schedule 10/40) ### 33.74 inch/ 1.18 inch (for 4 inch Schedule 80)  ### 33.1 Material certificate  ### 31.1 Material certificate  ### 32.2 Material certificate  ### 33.1 Material certificate  ### 30.3	Dimension centering weight	
### 245 mm/ 30 mm (for 2 inch tubes) ### 25 mm/ 30 mm (for 3 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch tubes) ### 25 mm/ 30 mm (for 4 inch Schedule 160) ### 26 mm/ 30 mm (for 2 inch Schedule 40/80) ### 26 mm/ 30 mm (for 4 inch Schedule 40/80) ### 26 mm/ 30 mm (for 4 inch Schedule 80)  ### 26 mm/ 30 mm (for 4 inch Schedule 80)  ### 26 mm/ 30 mm (for 4 inch fubes) ### 27 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm/ 20 mm (for 4 inch fubes) ### 27 mm/ 20 mm/ 2	Without	0
### 75 mm/ 30 mm (for 3 inch tubes) ### 75 mm/ 30 mm (for 4 inch tubes) ### 1.57 inch/ 1.18 inch ### 1.77 inch/ 1.18 inch ### 1.79 inch Schedule 40/80) ### 2.95 inch/ 1.18 inch ### 1.78 inch Schedule 10/40) ### 3.74 inch/ 1.18 inch ### 1.78 inch Schedule 80)  ### 2.2 Material certificate  ### 2.2 Material certificate  ### 2.2 Material certificate  ### 2.3.1 Material certificate  ### 2.2 Material certificate  ### 2.3.1 Material certificate  ### 3.3.1 Material certificate	ø40 mm/ 30 mm	
### ### ### ### ### ### ### ### ### ##	ø45 mm/ 30 mm (for 2 inch tubes)	2
#1.57 inch/ 1.18 inch (for 2 inch Schedule 160) #1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80) #2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40) #3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  **Certificates** Without 2.2 Material certificate 3.1 Material certificate  **Lengths** Rod #8 mm. 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  **5  **6  **6  **6  **6  **6  **6  **	ø75 mm/ 30 mm (for 3 inch tubes)	
(for 2 inch Schedule 160)  ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)  ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  Lengths  Rod ø8 mm  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)	,	
(for 2 inch Schedule 40/80)  Ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)  Ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates  Without  2.2 Material certificate  3.1 Material certificate  Lengths  Rod Ø8 mm  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  7  8  A A  A A  A A  A B  A C  A D  A D  A D  A D  A D	(for 2 inch Schedule 160)	5
7 82.95 inch/ 1.18 inch (for 3 inch Schedule 10/40) 83.74 inch/ 1.18 inch (for 4 inch Schedule 80)  Certificates Without 2.2 Material certificate 3.1 Material certificate  Lengths Rod Ø8 mm 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)	6
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	ø2.95 inch/ 1.18 inch	7
Certificates Without 2.2 Material certificate 3.1 Material certificate 2 Lengths Rod ø8 mm 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  A B  A C  A D  A D	ø3.74 inch/ 1.18 inch	8
Without 2.2 Material certificate 3.1 Material certificate 2  Lengths Rod ø8 mm 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  A E	<u>`</u>	
2 Lengths Rod Ø8 mm. 300 1 000 mm (11.81 39.37 inch) 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch) 2 2 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	Without	
Lengths  Rod ø8 mm.  300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  AE		
Rod ø8 mm.         300 1 000 mm (11.81 39.37 inch)       A A         1 001 2 000 mm (39.41 78.74 inch)       A B         2 001 3 000 mm (78.78 118.11 inch)       A C         3 001 4 000 mm (118.15 157.48 inch)       A D         4 001 5 000 mm (157.52 196.85 inch)       A E		
300 1 000 mm (11.81 39.37 inch)  1 001 2 000 mm (39.41 78.74 inch)  2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  A A A A A A A A A A A A A A A A A A A	Lengths Rod @8 mm	
1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) 3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)  A B  A B  A C  A D		
2 001 3 000 mm (78.78 118.11 inch)  3 001 4 000 mm (118.15 157.48 inch)  4 001 5 000 mm (157.52 196.85 inch)  AE		
3 001 4 000 mm (118.15 157.48 inch) AD 4 001 5 000 mm (157.52 196.85 inch) AE	,	
4 001 5 000 mm (157.52 196.85 inch)		
· · ·		-1-
5 001 6 000 mm (196.89 236.22 inch)	,	
	5 UU1 6 UU0 mm (196.89 236.22 inch)	A F

Selection and Ordering data	Article No.	
SITRANS LG Replacement Probes	7ML5841-	
		0
Rod ø12 mm		
300 1 000 mm (11.81 39.37 inch)	A	
1 001 2 000 mm (39.41 78.74 inch)	A	-
2 001 3 000 mm (78.78 118.11 inch)	A	
3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)	A	_
5 001 6 000 mm (196.89 236.22 inch)	AI	
Rod ø16 mm	***	
300 1 000 mm (11.81 39.37 inch)	Al	N
1 001 2 000 mm (39.41 78.74 inch)	A	P
2 001 3 000 mm (78.78 118.11 inch)	A	a
3 001 4 000 mm (118.15 157.48 inch)	Al	3
4 001 5 000 mm (157.52 196.85 inch)	A	S
5 001 6 000 mm (196.89 236.22 inch)	A.	Г
Cable Lengths ø2mm and 4 mm/316		
501 1000 mm (19.72 39.37 inch)	Al	
1 001 5 000 mm (39.41 196.85 inch)	A'	-
5 000 10 000 mm (196.89 393.70 inch) 10 001 15 000 mm (393.74 590.55 inch)	A	-
15 001 20 000 mm (590.59 787.40 inch)	A.	-
20 001 25 000 mm (787.44 984.25 inch)	В	-
25 001 30 000 mm	BI	3
(984.29 1 181.10 inch)	В	
30 001 35 000 mm (1 181.14 1 377.95 inch)	В	,
35 001 40 000 mm (1 377.99 1 574.80 inch)	ВІ	ס
40 001 45 000 mm	В	E
(1 574.84 1 771.65 inch) 45 001 50 000 mm	В	F
(1 771.69 1 968.50 inch)		
50 001 55 000 mm (1 968.54 2 165.35 inch)	В	G
55 001 60 000 mm	ВІ	Н
(2 165.39 2 362.20 inch) 60 001 65 000 mm	В	J
(2 362.24 2 559.06 inch)		
65 001 70 000 mm (2 559.09 2 755.91 inch)	В	(
70 001 75 000 mm	В	L
(2 755.94 2 952.76 inch)		

Guided wave radar transmitters

Selection and Ordering data Article No.		
SITRANS LG Replacement Probes	7ML5841-	
		0
Cable Lengths ø6mm/316		
501 1000 mm (19.72 39.37 inch)	В	
1 001 5 000 mm (39.41 196.85 inch) 5 000 10 000 mm (196.89 393.70 inch)	B B	
10 001 15 000 mm (393.74 590.55 inch)	В	Q
15 001 20 000 mm (590.59 787.40 inch)	В	
20 001 25 000 mm (787.44 984.25 inch)	В	
25 001 30 000 mm (984.29 1 181.10 inch)	B	1
30 001 35 000 mm	В	U
(1 181.14 1 377.95 inch) 35 001 40 000 mm	В	v
(1 377.99 1 574.80 inch)		
40 001 45 000 mm	В	N
(1 574.84 1 771.65 inch) 45 001 50 000 mm	В	x
(1 771.69 1 968.50 inch)		
50 001 55 000 mm (1 968.54 2 165.35 inch)	B <sup>*</sup>	Y
55 001 60 000 mm	C	A
(2 165.39 2 362.20 inch) 60 001 65 000 mm	C	В
(2 362.24 2 559.06 inch)		
65 001 70 000 mm (2 559.09 2 755.91 inch)	C	С
70 001 75 000 mm	C	D
(2 755.94 2 952.76 inch)		

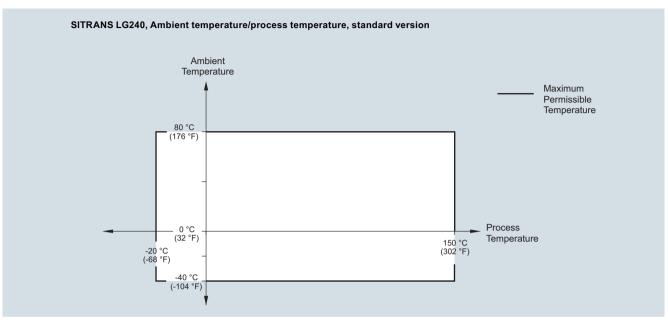
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part (cable version only)	Y02

- $^{1)}$  Available with Dimension centering weight: Without Option 0
- 2) Available with Dimension centering weight: Option 1 ... 8
- 3) All Probe types are only available with corresponding Probe lengths
- 4) Available with Probe type Option AQ
- 5) Available with Process fitting option 2 and 3
- 6) Not available with Probe type option AQ and AW
- 7) Available with Probe type option AE, AH, and AW
- 8) Not available with Process fitting option 2
- 9) Available with Probe type option AA, AC, AE, AG and AW
- <sup>10)</sup>Available with Process fitting 0 and 3

Guided wave radar transmitters

## SITRANS LG series

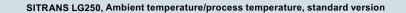
## Characteristic curves

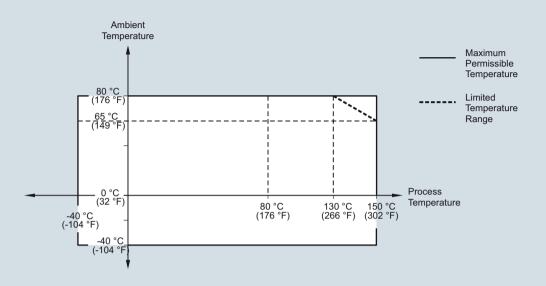


SITRANS LG240, Ambient temperature/process temperature curve

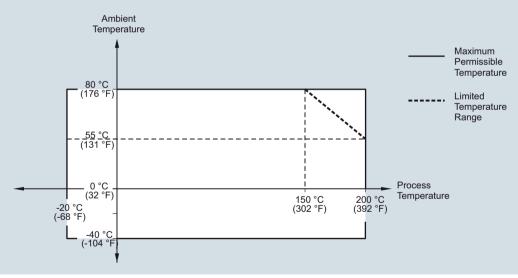
#### Guided wave radar transmitters

SITRANS LG series





#### SITRANS LG250, Ambient temperature/process temperature, temperature adapter version

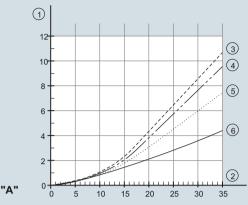


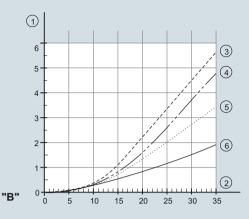
SITRANS LG250, Ambient temperature/process temperature curves

#### Guided wave radar transmitters

#### SITRANS LG series

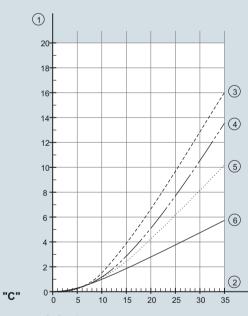
#### SITRANS LG260, Maximum tensile load with cereals and plastic granules - cable: ø 4 mm (0.157 inch)

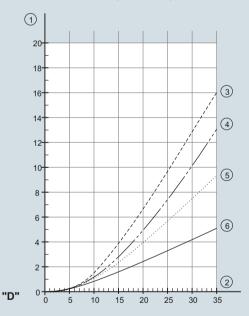




- A. Cereals
- B. Plastic granules
- 1. Tensile force in kN (the determined value must be multiplied with safety factor 2)
- 2. Cable length in m
- 3. Vessel diameter 12 m (39.37 ft)
- 4. Vessel diameter 9 m (29.53 ft)
- 5. Vessel diameter 6 m (19.69 ft)
- 6. Vessel diameter 3 m (9.843 ft)

#### SITRANS LG260, Maximum tensile load with sand and cement - cable: ø 4 mm (0.157 inch)





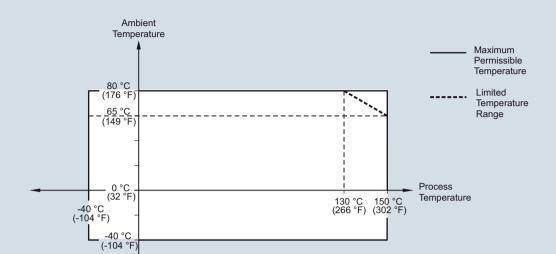
- C. Sand
- D. Cement
- 1. Tensile force in kN (the determined value must be multiplied with safety factor 2)  $\,$
- 2. Cable length in m
- 3. Vessel diameter 12 m (39.37 ft)
- 4. Vessel diameter 9 m (29.53 ft)
- 5. Vessel diameter 6 m (19.69 ft)
- 6. Vessel diameter 3 m (9.843 ft)

SITRANS LG260, Maximun tensile load curves

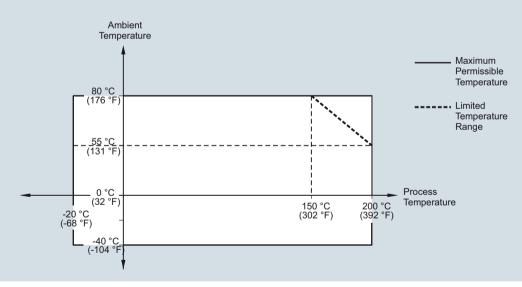
Guided wave radar transmitters

SITRANS LG series





# SITRANS LG260, Ambient temperature/process temperature, temperature adapter version Cable version with $\emptyset$ 4 mm (0.157 inch) Cable version, PA coated with $\emptyset$ 6 mm (0.236 inch)

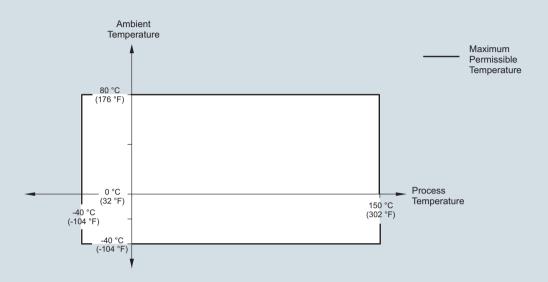


SITRANS LG260, Ambient temperature/process temperature curves

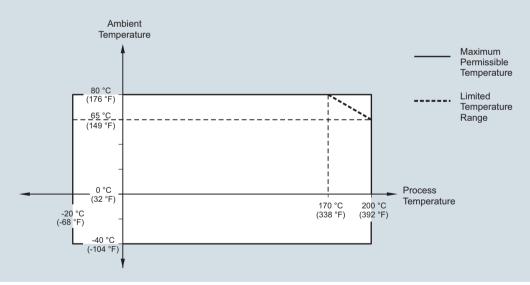
Guided wave radar transmitters

## SITRANS LG series

SITRANS LG260, Ambient temperature/process temperature, standard version Cable version with ø 6 mm (0.236 inch)
Cable version, PA coated with ø 11 mm (0.433 inch)



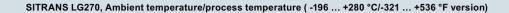
SITRANS LG260, Ambient temperature/process temperature, temperature adapter version Cable version with  $\emptyset$  6 mm (0.236 inch)
Cable version, PA coated with  $\emptyset$  11 mm (0.433 inch)

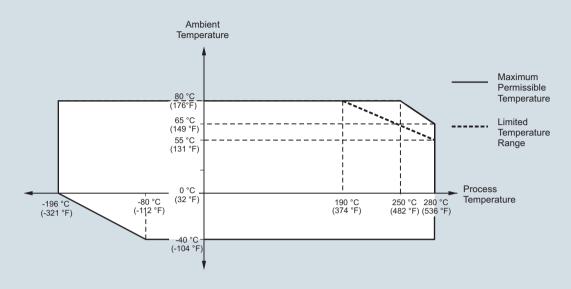


SITRANS LG260, Ambient temperature/process temperature curves

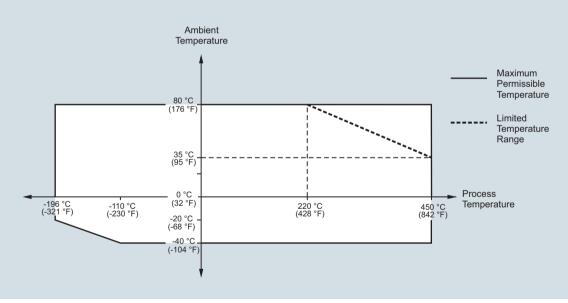
Guided wave radar transmitters

SITRANS LG series





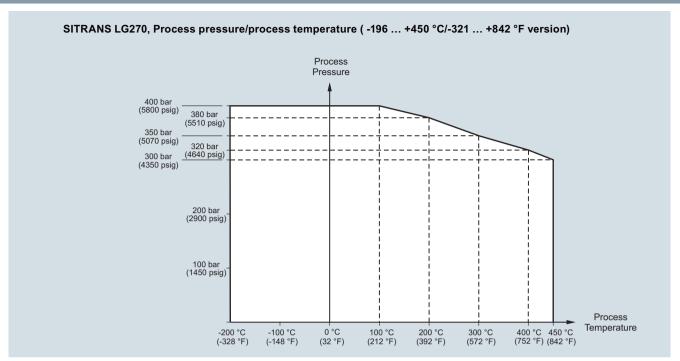
#### SITRANS LG270, Ambient temperature/process temperature ( -196 ... +450 °C/-321 ... +842 °F version)



SITRANS LG270, Ambient temperature/process temperature curves

Guided wave radar transmitters

## SITRANS LG series

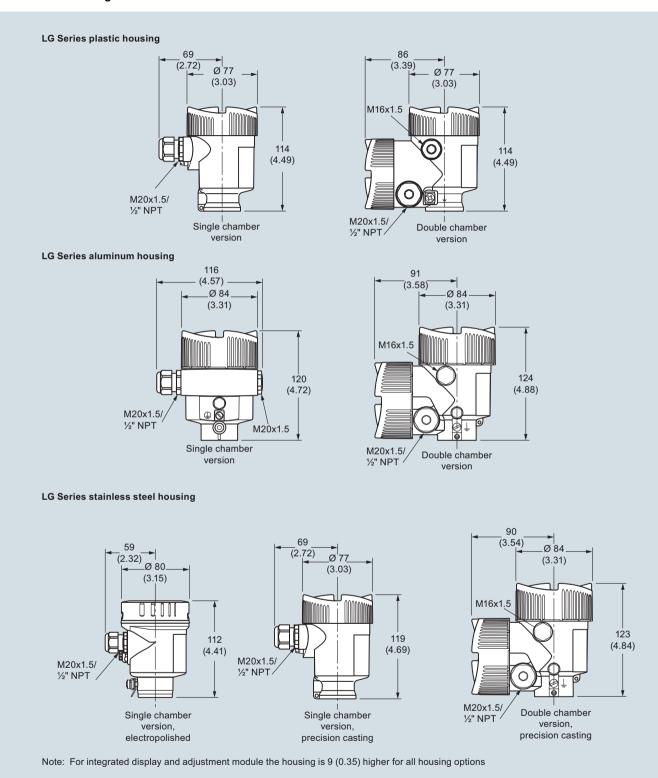


SITRANS LG270, Process pressure/process temperature curve

Guided wave radar transmitters

SITRANS LG series

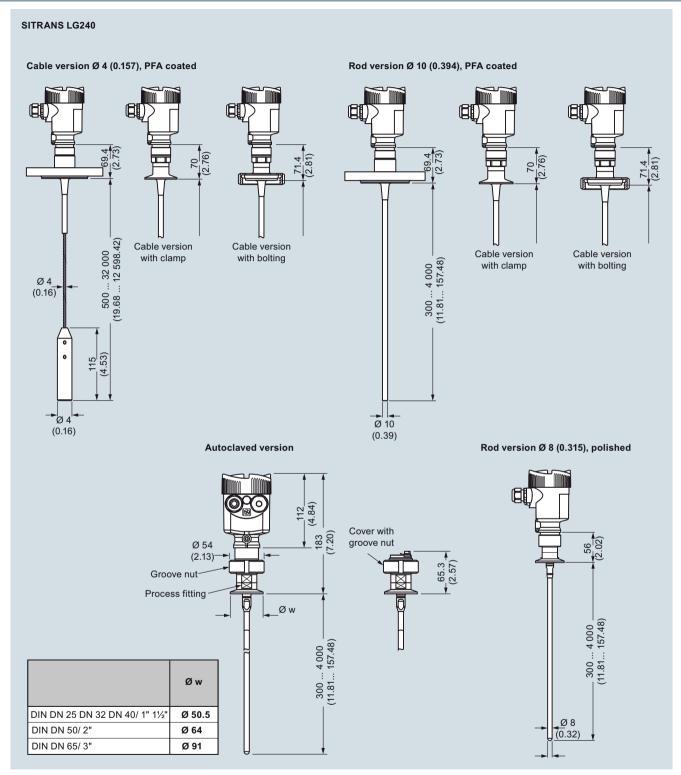
# Dimensional drawings



SITRANS LG series, dimensions in mm (inch)

#### Guided wave radar transmitters

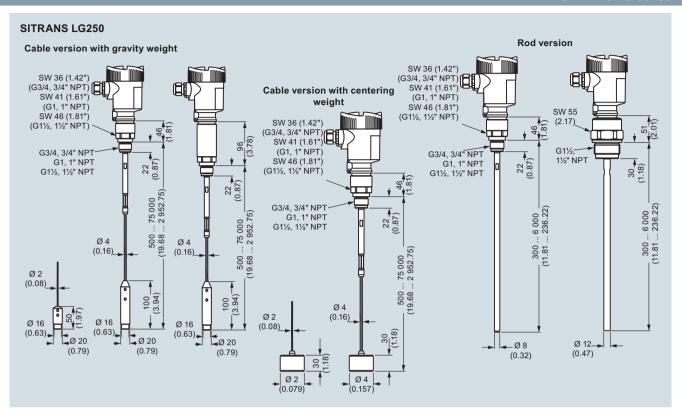
## SITRANS LG series



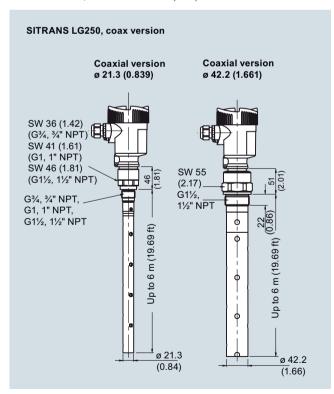
SITRANS LG240, dimensions in mm (inch)

Guided wave radar transmitters

#### SITRANS LG series



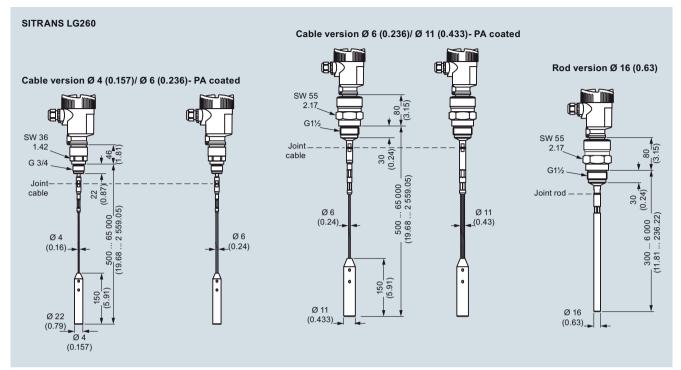
SITRANS LG250, dimensions in mm (inch)



SITRANS LG250, dimensions in mm (inch)

Guided wave radar transmitters

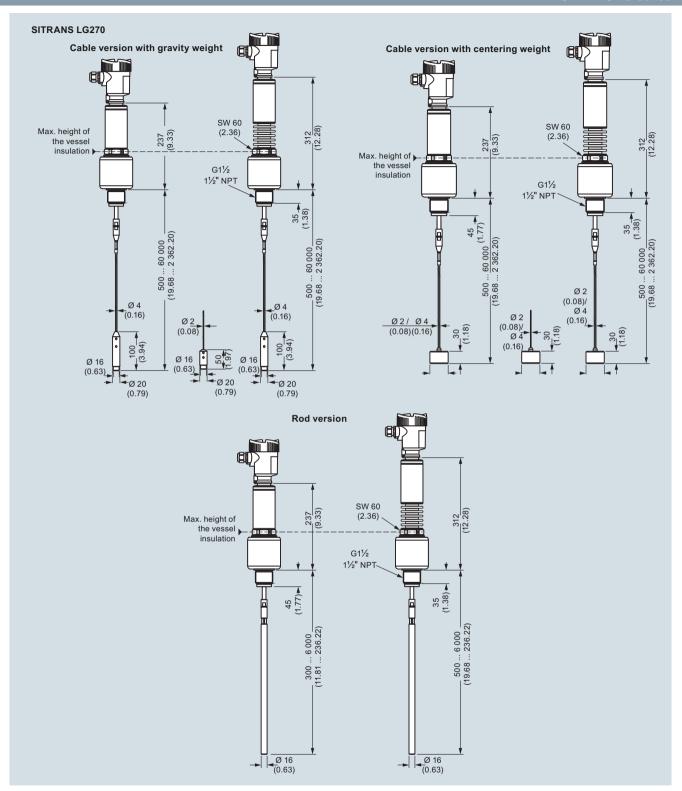
## SITRANS LG series



SITRANS LG260, dimensions in mm (inch)

Guided wave radar transmitters

## SITRANS LG series



SITRANS LG270, dimensions in mm (inch)

Guided wave radar transmitters

## SITRANS LG series

# SITRANS LG270, coax version Temperature version -196 ... +280 °C (-321 ... 536 °F) SW 60 (2.36) (2.36) (2.36) (3.77) (4.68) (2.36) (2.36) (3.77) (4.66) (4.66)

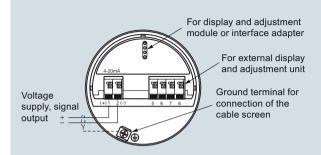
SITRANS LG270, dimensions in mm (inch)

Guided wave radar transmitters

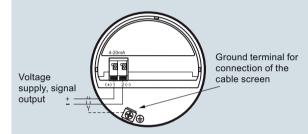
#### **SITRANS LG series**

## Schematics

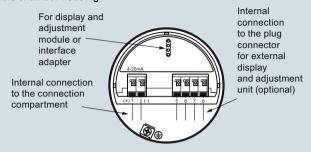
# 2-wire HART electronic option, electronics and connection compartment, single chamber housing



# 2-wire HART electronic option, connection compartment, Ex-d-ia double chamber housing



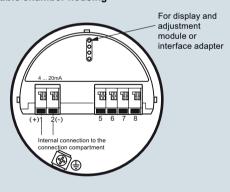
# 2-wire HART electronic option, electronics compartment, double chamber housing



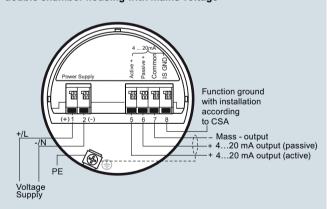
Note: All 2-wire HART connections and electronics are also available with SIL

#### SITRANS LG series, connections

# 4-wire HART electronic option, electronics compartment, double chamber housing



# 4-wire electronic option, connection compartment with double chamber housing with mains voltage



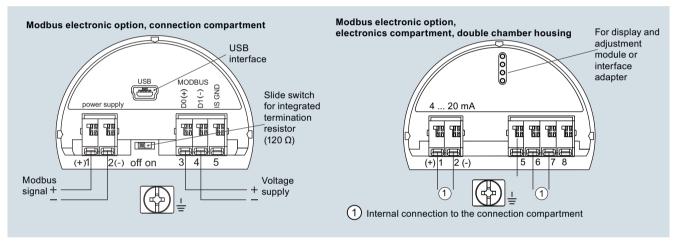
SITRANS LG series, connections

#### Guided wave radar transmitters

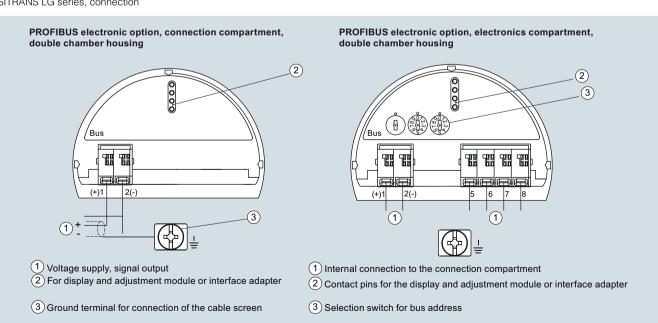
#### SITRANS LG series

#### Connection compartment with low voltage Supplementary electronics Function ground 88 88 TH TH TH TH TH TH TH with installation according to CSA Mass - output 4 ... 20 mA output (passive) 4 ... 20 mA output (active) 1 + 7 Voltage 1) First current output (I) - Voltage supply and signal output (HART) supply (2) Second current output (II) - Voltage supply and signal output (without HART)

SITRANS LG series, connections



SITRANS LG series, connection

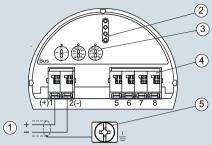


LG series, connection

Guided wave radar transmitters

SITRANS LG series

# PROFIBUS electronic option, electronics and connection compartment, single chamber housing



- 1 Voltage supply, signal output
- For display and adjustment module or interface adapter
- 3 Selection switch for bus address
- 4 For external display and adjustment unit
- 5 Ground terminal for connection of the cable screen

LG series, connection

Continuous level measurement - Capacitance transmitters

#### **SITRANS LC300**

#### Overview



SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, and mining, aggregate, and cement industries.

#### Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media and non-metallic vessels

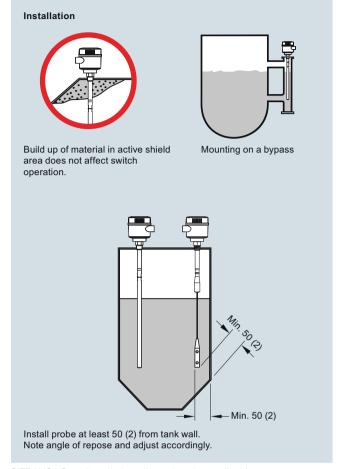
#### Application

SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

 Key Applications: conductive and non-conductive media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

# Configuration



SITRANS LC300 installation, dimensions in mm (inch)

# Continuous level measurement - Capacitance transmitters

## SITRANS LC300

# Technical specifications

recillical specifications	
Input	
Measuring range	1.66 3 300 pF
Span	Min. 3.3 pF
Output	
Loop current	Continuous signal 4 20 mA/ 20 4 mA according to NAMUR 43
Accuracy (transmitter)	
Temperature stability	0.25 % of actual capacitance value
Non-linearity and repeatability	< 0.4 % of full scale and actual measurement value
Accuracy	Deviation < 0.5 % of actual measurement value
Rated operating conditions <sup>1)</sup>	
Ambient conditions  • Ambient temperature  • Installation category  • Pollution degree  • Ingress protection	-40 +85 °C (-40 +185 °F) <sup>2)</sup> I 4 Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
Process pressure	-1 +35 bar g (-14.6 +511 psi g)
Process temperature	-40 +200 °C (-40 +392 °F) <sup>3)</sup>
Min. dielectric constant ε <sub>r</sub>	1.5
Design	
Material • Enclosure	Aluminum, epoxy-coated
Probe diameter	10 mm (0.75 in als) with DEA in allot
<ul><li>Rod version</li><li>Cable version</li></ul>	19 mm (0.75 inch) with PFA jacket 9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
Rod version	Threaded: 120 mm (4.72 inch) Flanged: 100 mm (3.94 inch)
Cable version	Threaded: 125 mm (4.92 inch) Flanged: 105 mm (4.13 inch)
Process connection of probe	
Threaded rod mounting	34",1",11/4", 11/2" NPT [(Taper), ANSI/ASME B1.20.1]
	R ¾",1", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G ¾",1", 1½" [(BSPP),
Threaded cable mounting	EN ISO 228-1/PF (JIS-P), JIS B 0202] 1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Flange mounting	1 4" ASME, DN 25 100
Enclosure cable inlet	2 x ½" NPT or 2 x M20x1.5
Power supply	12 30 V DC any polarity, 2-wire current loop circuit
User Interface	
Display	Local LCD, 4 digit, each 0 9 and limited alpha characters

Safety	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 20.5 mA, fault $\leq$ 3.6 or $\geq$ 21 mA (22 mA)
Certificates and approvals	
General	CE, CSA <sub>US/C</sub> , FM, RCM
Dust Ignition Proof (Intrinsically Safe probe circuit) • Canada/USA	FM/CSA: Class II, Div. 1, Groups E, F, G Class III T4
• Europe	ATEX 1/2 D T100 °C
Flame Proof (Intrinsically Safe probe circuit) • Europe	ATEX II 1/2 G EEx d [ia] IIC T6 T1 ATEX II 1/2 D T100 °C
Explosion Proof (Intrinsically Safe probe circuit) • Canada/USA	Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class III T4
Marine	Bureau Veritas Type Approval ABS Type Approval
Overfill Protection	AIB-Vincotte
Other	Pattern Approval (China)

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/16.
- $^{2)}$  Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- 3) Not suitable for steam environments

Design: Probe			
	Rod version	Stilling well ver- sion	Cable version
Length	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA, 316L stainless steel	PFA, 316L stainless steel	316L stainless steel or 316L stainless steel with PFA insula- tion
O-ring seal material	FKM or FFKM	FKM or FFKM	FKM or FFKM
Thermal isolator	Optional	Optional	Optional
Options	N/A	N/A	Mounting eye for PFA insulated cable version

# Continuous level measurement - Capacitance transmitters

SITHANS LC300		
Selection and Ordering data	Artic	le No.
SITRANS LC300, rod version	7ML	5670-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	-	0
∠ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel	0.4	
%" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1]	0 A 0 B	
11/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 C	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A	
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1½" [(BSPT), EN 10226/PT (JIS-T),	1 B 1 D	
JIS B 0203]	1.0	
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A	
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B	
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	
Welded flange, 316L stainless steel, raised face 1 ASME. 150 lb	5 A	
1" ASME, 300 lb	5 B	
1" ASME, 600 lb	5 C	
1½" ASME, 150 lb	5 D	
1½" ASME, 300 lb 1½" ASME, 600 lb	5 E 5 F	
2" ASME, 150 lb	5 G	
2" ASME, 300 lb	5 H	
2" ASME, 600 lb	5 J	
3" ASME, 150 lb	5 K	
3" ASME, 300 lb 3" ASME, 600 lb	5 L 5 M	
4" ASME, 150 lb	5 N	
4" ASME, 300 lb	5 P	
4" ASME, 600 lb	5 Q	
Welded flange, 316L stainless steel,  Type A flat faced <sup>1)</sup>		
DN 25, PN 16	6 A	
DN 25, PN 40	6 B	
DN 40, PN 16	6 C	
DN 40, PN 40	6 D 6 E	
DN 50, PN 16 DN 50, PN 40	6 F	
DN 80, PN 16	6 G	
DN 80, PN 40	6 H	
DN 100, PN 16	6 J	
DN 100, PN 40	6 K	
Probe Length (from flange face or including process thread)		
Add Order code Y01 and plain text:		
"Insertion length mm" 300 1 000 mm (11.81 39.37 inch)	А	
1 001 2 000 mm (39.41 78.74 inch)	В	
2 001 3 000 mm (78.78 118.11 inch)	C	
3 001 4 000 mm (118.15 157.48 inch) 4 001 5 000 mm (157.52 196.85 inch)	D	
Thermal isolator		
Without thermal isolator With thermal isolator [for process connection		0
temperatures over 85 °C (185 °F)]		

Selection and Ordering data	Article No.
SITRANS LC300, rod version	7ML5670-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	0
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0 1
Probe material 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod	0
Approvals General Safety (CSA, FM, CE, RCM) Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6T1, ATEX II 1/2 D T100 °C	A B C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class III, Div. 1, Groups E, F, G CSA/FM Class III T4	D E
Enclosure  Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65  Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65  Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	A B C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D

<sup>&</sup>lt;sup>1)</sup> Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order.	A5E32268590
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	0
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face <sup>1)</sup>	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
,	
4" ASME, 150 lb	5 N
4" ASME, 300 lb 4" ASME, 600 lb	5 P 5 Q
Welded flange, 316L stainless steel,	5 Q
Type A flat faced <sup>1)</sup>	
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text:	
"Insertion length mm"	
300 1 000 mm (11.81 39.37 inch)	A
1 001 2 000 mm (39.41 78.74 inch)	В
2 001 3 000 mm (78.78 118.11 inch)	С
3 001 4 000 mm (118.15 157.48 inch)	D
4 001 5 000 mm (157.52 196.85 inch)	E
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
35 mm (1.38 inch) diameter stilling well, with 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod with PTFE spacers	1
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe	В
CE, RČM, ATEX II 1/2 D T100 °C	
Flame Proof Enclosure With IS Probe	С
CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 T1, ATEX II 1/2 D T100 °C	
7.1.E.7.11 1/2 D 1 100 O	

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	- 0
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	В
Aluminum epoxy coated 2 x $1/2$ " NPT via adapter - cable inlet, IP68	С
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D

<sup>1)</sup> Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

Selection and Ordering data	Order code
Further designs	
Please add " <b>-Z</b> " to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5HE
French	7ML1998-5HE
German	7ML1998-5HE
Spanish	7ML1998-5HE
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and	7ML1998-5QH
Operating Instructions library.	
Accessories Electronic transmitter kit	7ML1830-1KN
(includes transmitter and driver)	/WIL 1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750

# Continuous level measurement - Capacitance transmitters

## SITRANS LC300

Selection and Ordering data	Article No.
SITRANS LC300, cable version	7ML5672-
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	0
Process connection	
Threaded, 316L stainless steel 1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face 1)	
1½" ASME, 150 lb 1½" ASME, 300 lb	5 D 5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb 2" ASME, 300 lb	5 G 5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb 3" ASME, 600 lb	5 L 5 M
4" ASME, 150 lb 4" ASME, 300 lb	5 N 5 P
4" ASME, 600 lb	5 Q
Welded flange, 316L stainless steel,	
Type A flat faced <sup>1)</sup> DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F 6 G
DN 80, PN 16 DN 80, PN 40	6 H
DN 100, PN 16 DN 100, PN 40	6 J 6 K
Probe Length	-
(from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length mm"	
1 000 2 000 mm (39.37 78.74 inch)	A
2 001 4 000 mm (78.78 157.48 inch) 4 001 6 000 mm (157.52 236.22 inch)	B C
6 001 8 000 mm (236.26 314.96 inch)	D
8 001 10 000 mm (315.00 393.70 inch)	E
10 001 12 000 mm (393.74 472.44 inch)	F
12 001 14 000 mm (472.48 551.18 inch)	G
14 001 16 000 mm (551.22 629.92 inch) <sup>2)</sup> 16 001 18 000 mm (629.96 708.66 inch) <sup>2)</sup>	H
18 001 20 000 mm (708.70 787.40 inch) <sup>2)</sup> 20 001 22 000 mm (787.44 866.14 inch) <sup>2)</sup>	K
22 001 24 000 mm (866.18 944.88 inch) <sup>2)</sup>	L M
24 001 25 000 mm (944.92 984.25 inch) <sup>2)</sup>	N
Thermal isolator	
Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0 1
Probe material	
Bare 316L stainless steel cable and 316L	0
stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield	

Selection and Ordering data	Article No.		
SITRANS LC300, cable version	7ML5672-		
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.			0
Approvals			
General Safety (CSA, FM, CE, RCM)  Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C		A B	
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6T1, ATEX II 1/2 D T100 °C		С	
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		D	
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4		Ε	
Enclosure			
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65		4	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65		1	В
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68		•	С
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68			D
1)			

<sup>1)</sup> Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order.	7ML1998-5QH81
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data SITRANS LC300, PFA coated cable version	Article No. 7ML5673-
An inverse frequency shift capacitance continuous	
<ul><li>level transmitter for liquids and solids applications.</li><li>Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</li></ul>	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226/PT (JIS-T),	0 D 1 D
JIS B 0203]	
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face 1)	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb 1½" ASME, 600 lb	5 E 5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb 3" ASME, 300 lb	5 K 5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb 4" ASME, 600 lb	5 P 5 Q
Welded flange, 316L stainless steel,	o u
Type A flat faced <sup>1)</sup> DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16 DN 80, PN 40	6 G 6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text:	
"Insertion length mm" 1 000 2 000 mm (39.37 78.74 inch)	Α
2 001 4 000 mm (78.78 157.48 inch)	В
4 001 6 000 mm (157.52 236.22 inch)	С
6 001 8 000 mm (236.26 314.96 inch) 8 001 10 000 mm (315.00 393.70 inch)	D E
10 001 12 000 mm (393.74 472.44 inch)	F
12 001 14 000 mm (472.48 551.18 inch)	G
14 001 16 000 mm (551.22 629.92 inch) <sup>2)</sup> 16 001 18 000 mm (629.96 708.66 inch) <sup>2)</sup>	H
18 001 20 000 mm (708.70 787.40 inch) <sup>2)</sup>	K
20 001 22 000 mm (787.44 866.14 inch) <sup>2)</sup>	L
22 001 24 000 mm (866.18 944.88 inch) <sup>2)</sup>	M
24 001 25 000 mm (944.92 984.25 inch) <sup>2)</sup> Thermal isolator	_ N
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM [for process temperatures above -20 °C	0
(-4 °F)]	

Selection and Ordering data	Article No.
SITRANS LC300, PFA coated cable version	7ML5673-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
Probe material PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	1
Approvals General Safety (CSA, FM, CE, RCM) Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	A B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6T1, ATEX II 1/2 D T100 °C	С
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D E
Enclosure  Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65  Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	A B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	С
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
Mounting eye Without Mounting eye With mounting eye	0

- <sup>1)</sup> Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.
- 2) Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

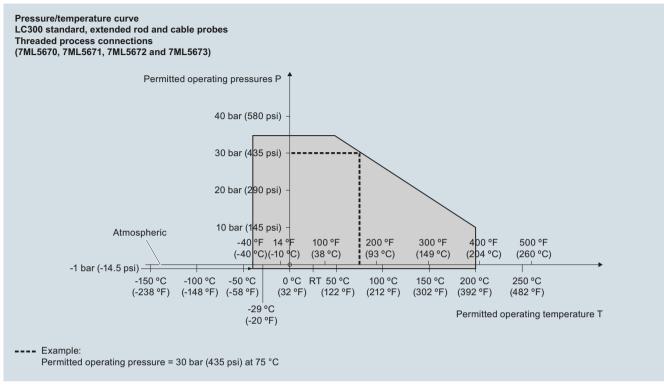
# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual	7ML1998-5QH81
Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

Continuous level measurement - Capacitance transmitters

SITRANS LC300

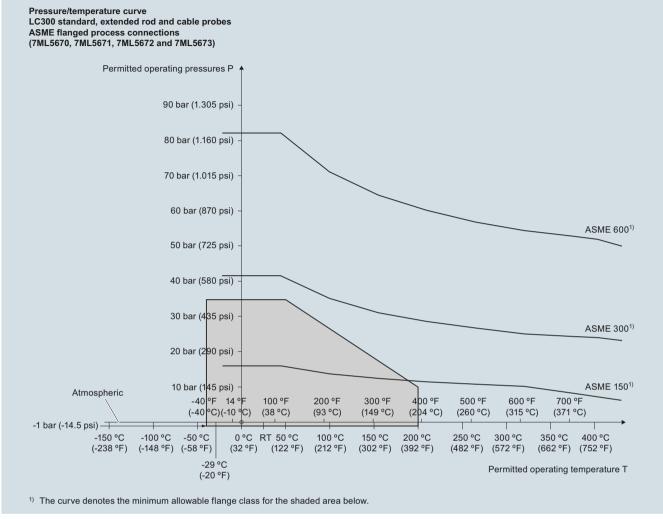
# Characteristic curves



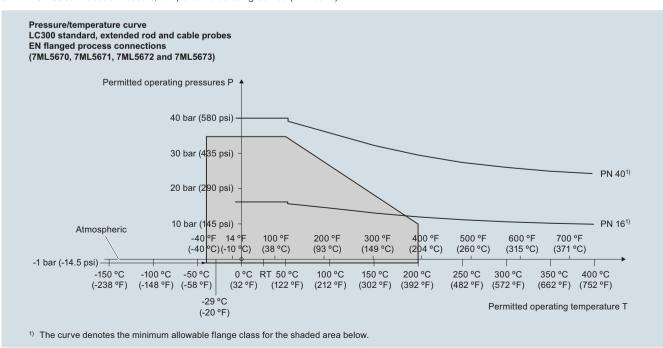
SITRANS LC300 Process Pressure/Temperature derating curves (7ML5625)

Continuous level measurement - Capacitance transmitters

#### **SITRANS LC300**



SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)



SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

Continuous level measurement - Capacitance transmitters

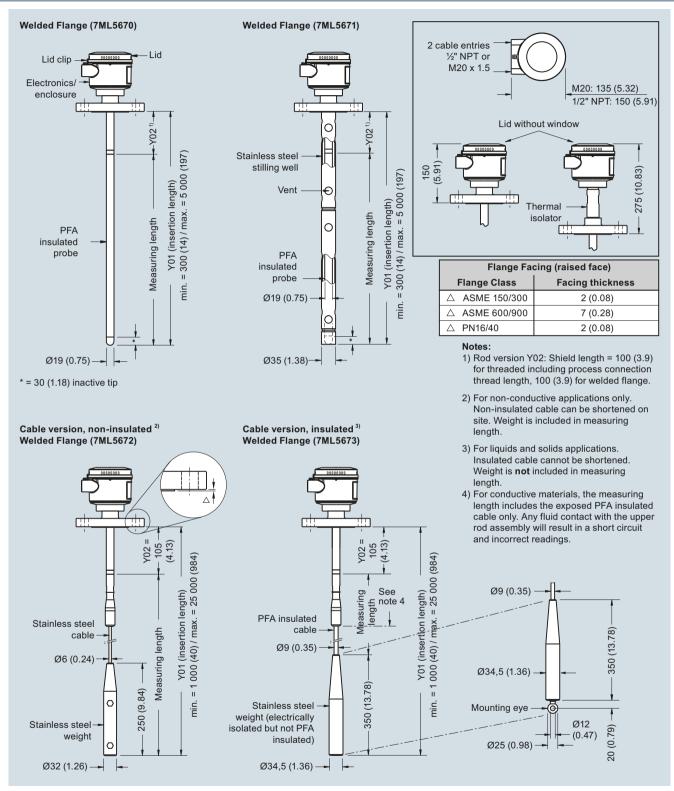
**SITRANS LC300** 

# Dimensional drawings

#### Threaded (7ML5670) Threaded (7ML5671) - Lid Lid clip 2 cable entries Electronics/ 1/2" NPT or 20 (0.79) enclosure M20 x 1.5 M20: 135 (5.32) 1/2" NPT: 150 (5.91)Lid without window Stainless steel = 300 (14) / max. = 5 000 (197) stilling well 300 (14) / max. = 5 000 (197) Y01 (insertion length) Vent € 275 (10.83) (insertion length) Measuring length Measuring length PFA Thermal insulated isolator probe insulated probe Y01 min. Ø19 (0.75) mi. Note: 1) Rod version Y02: Shield length = 100 (3.9) for threaded including process connection thread length, 100 (3.9) for welded flange Ø35 (1.38) 2) For non-conductive applications only. Ø19 (0.75) Non-insulated cable can be shortened on \* = 30 (1.18) Inactive tip site. Weight is included in measuring length. 3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is not included in measuring Cable version, non-insulated 2) Cable version, insulated 3) length. Threaded (7ML5672) Threaded (7ML5673) 4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings. 20 (0.79) Y02 = 105 -(4.13)Y02 = 105 (4.13)Y01 (insertion length)= 1 000 (40) / max. = 25 000 (984) $= 25\,000\,(984)$ Ø9 (0.35) See Measuring 350 (13.78) PFA insulated Stainless steel 000 (40) / max. (insertion cable Measuring length cable Ø9 (0.35) Ø34,5 (1.36) -Ø6 (0.24) 70 Stainless steel weight (electrically 350 (13.78) Mounting eye 1 (9.84)isolated but not Stainless steel PFA insulated), Ø12 min. weight, actual (0.79)actual weight = (0.47)250 ( weight = (1.27 kg Ø25 (0.98) (2.15 kg [4.76 lb]) [2.80 lb]) 20 Ø32 (1.26) --Ø34,5 (1.36) -

SITRANS LC300 - Threaded Process Connections, dimensions in mm (inch)

Continuous level measurement - Capacitance transmitters

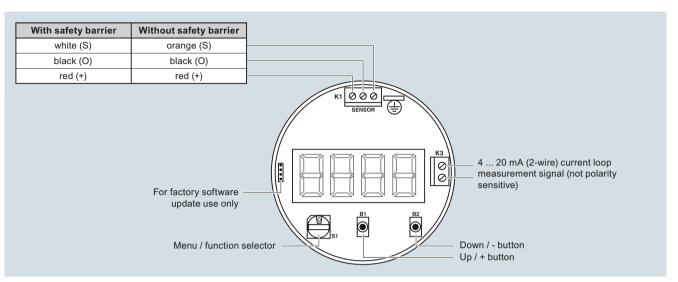


SITRANS LC300 - Flanged Process Connections, dimensions in mm (inch)

Continuous level measurement - Capacitance transmitters

## SITRANS LC300

# Schematics



SITRANS LC300 connections

Continuous level measurement - Capacitance transmitters

#### **SITRANS LC500**

#### Overview



SITRANS LC500 is an inverse frequency shift capacitance level or interface transmitter for extreme and critical process conditions, such as oil and liquified natural gas (LNG) as well as toxic and aggressive chemicals and vapors.

#### Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Simple push-button calibration and integrated local display
- Inverse frequency approach provides high resolution
- 2-wire loop powered 4 to 20/20 to 4 mA measurement signal
- Pre-detection alarm and full function diagnostics
- High temperature and pressure resistant (optional)
- Full-function diagnostics comply with NAMUR NE 43
- Easy calibration locally or via HART (using SIMATIC PDM software)

#### Application

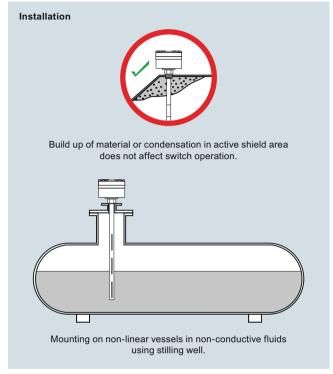
SITRANS LC500's advanced electronics provide one-step, push-button calibration and local display for easy on-site installation and setup.

The unique mechanical probe design coupled with a high performance transmitter gives superior performance in toxic and aggressive chemicals, acids, caustics, adhesives and in viscous conductive and non-conductive materials.

The SMART 2-wire transmitter has HART communications for remote commissioning and inspection.

 Key Applications: Oil/water or foam/liquid interface measurement in separators or coalescers, cryogenic applications including CO<sub>2</sub> and liquified natural gas (LNG), distillation/ regeneration tanks with high temperatures

## Configuration



SITRANS LC500 installation, dimensions in mm (inch)

# Continuous level measurement - Capacitance transmitters

## **SITRANS LC500**

# Technical specifications

lechnical specifications	
Input	
Measuring range	1 3 300 pF
Span	Min. 3.3 pF
Output	
Solid-state switch  Output  Protection  Max. switching voltage	Galvanically isolated Bipolar • 30 V (DC)
Max. load current     Voltage drop     Time delay (pre or post switching)	• 30 V peak (AC) 82 mA < 1 V, typical at 50 mA 1 60 s
Loop current	3.6 22 mA/22 3.6 mA (2-wire current loop)
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typically < 0.1 %) of actual measured value, whichever is greater over the full temperature range
Non-linearity and repeatability	< 0.1 % of range and actual measured value respectively
Accuracy	Deviation < 0.1 % of measured value
Rated operating conditions <sup>1)</sup>	
Installation conditions  • Location	Indoor/outdoor
Ambient conditions  • Ambient temperature (transmitter)  • Installation category  • Pollution degree	-40 +85 °C (-40 +185 °F) <sup>2)</sup> II
$ \begin{tabular}{ll} Medium conditions \\ \bullet & Relative dielectric constant $\epsilon_r$ \\ \bullet & Process temperature \\ \end{tabular} $	Min. 1.5 Temperature rating of process seal is pressure dependent.
- Standard (PFA) <sup>3)</sup> - Cryogenic version	See Pressure/Temperature curves. -50 +200 °C (-58 +392 °F) -200 +200 °C (-328 +392 °F) Contact ceg.smpi@siemens.com for
Process pressure	details.  Pressure rating of process seal is temperature dependent.  See Pressure/Temperature curves.
Standard (PFA)	-1 150 bar g (2175 psi g)
Design	
Material  • Wetted parts material  - Standard rod  • Probe insulation (rod)  • Cable	316L stainless steel PFA 316 stainless steel/ 316 stainless steel PFA
Probe diameter • Rod version	16 mm (0.63 inch) or
Cable version	24 mm (0.95 inch) 9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length • Minimum (rod version)	50 mm (1.97 inch), customer select- able (order number Y02)
Probe length	,
• Rod version	Max. 3.5 m (138 inch) with 16 mm rod, PFA Max. 5.5 m (216 inch) with 24 mm rod, PFA

Max. 35 m (1 378 inch)

• Cable version

Process connection of probe	
Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Flange mounting	ASME, EN 1092-1
Enclosure	
Material     Cable inlet	Aluminum, epoxy-coated 2 x ½ inch NPT
	(2 x M20x1.5, IP68 adapter, optional)
Degree of protection	Type 4X/NEMA4X/IP65, IP68
Power supply	12 33 V DC
User Interface	
Display	Local LCD, 4 digit, each 0 9 and limited alpha characters
Rotary function switch	For selecting programmable menu items
Push buttons	Red +, blue -, used in conjunction with rotary switch for programming
Features	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA)
Safety	Inputs/outputs fully galvanically isolated     Polarity-insensitive current loop     Fully potted     Integrated safety barrier
Diagnostics with fault alarm when:	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
Function rotary switch	Positions 0 9, A F
SMART communication	Conforming to HART Communication Foundation (HCF)
Certificates and approvals	
General Purpose	CE, CSA, FM, RCM
Non-incendive/Non-sparking	CSA/FM Class 1, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx nA [ib] IIC
	• T6 T4 T100 °C
Dust Ignition Proof (Intrinsically Safe Probe Circuit)	<ul> <li>CSA/FM Class II and III, Div. 1, Groups E, F, G</li> <li>ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C</li> </ul>
Explosion Proof (Intrinsically Safe Probe Circuit)	<ul> <li>FM Class 1, Div. 1, Groups A, B, C, D T4</li> <li>ATEX II 1/2 GD EEx d [ia] IIC T6 to T1</li> </ul>
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3 and ENV5, Bureau Veritas

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/348.
- $^{2)}$  Thermal isolator is used if process connection temperature exceeds 85  $^{\circ}\mathrm{C}$  (185  $^{\circ}\mathrm{F}$ ).
- 3) Not recommended for steam environments

Continuous level measurement - Capacitance transmitters

SITRANS LC500 probe version	Standard		Extended Cable version with Rod Sensor
Process connection types	Threaded or welded flange	Single piece flanged	Threaded or welded flange
Threaded	Available as standard	-	Available as standard
Flange	Available as standard	Available as standard	Available as standard
Process connection materials			
Stainless steel 316L	Available as standard	Available as standard	Available as standard
Probe insulation			
PFA	Available as standard	Available as standard	Available as standard
Length and Process parameters <sup>1)</sup>			
Rod length for PFA 16 mm version	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)
Rod length for PFA 24 mm version	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)
Cable length	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 5 000 mm (196.85 inch) <sup>2)</sup> Max. 35 000 mm (1 377.95 inch) <sup>2)</sup>
Maximum process pressure	See Pressure/Temperature curves for	specific probe type	5 bar g (73 psi g)
Maximum process temperature			100 °C (212 °F)

<sup>1)</sup> See Pressure/Temperature curves for specific probe type

 $<sup>^{2)}</sup>$  Refers to total insertion length. See dimension drawing on page 4/356 for further explanation

<sup>-</sup> Not available as standard

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange	7ML5513-
with Cable Sensor Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
Version 1) Cable, 9 mm (0.35 inch) diameter, 316 stainless steel with PFA insulation, weighted Add Order code Y01 and plain text: "Insertion length mm" 1 000 2 000 mm (39.37 78.74 inch) 2 001 4 000 mm (78.78 157.48 inch) 4 001 6 000 mm (157.52 236.22 inch) 6 001 8 000 mm (236.26 314.96 inch) 8 001 10 000 mm (315 393.70 inch) Longer lengths possible to a max. of 35 000 mm (114.83 ft). Contact ceg.smpi@siemens.com for details. Cable, 6 mm (0.24 inch) diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only) Add Order code Y01 and plain text: "Insertion length mm" 1 000 2 000 mm (39.37 78.74 inch) <sup>2)</sup> 2 001 4 000 mm (78.78 157.48 inch) <sup>2)3</sup> 4 001 6 000 mm (78.78 157.48 inch) <sup>2)3</sup> 6 001 8 000 mm (236.26 314.96 inch) <sup>2)3</sup> 8 001 10 000 mm (315 393.70 inch) <sup>2)3</sup> Cable lengths up to 25 000 mm (984.25 inch) are possible for non-conductive media. Cable lengths up to 15 000 mm (590.55 inch) are possible for	0 E 1 E 2 E 3 E 4 E 0 F 1 F 2 F 3 F 4 F
conductive media. Contact ceg.smpi@siemens.com for details.  Process connection (316L stainless steel) Threaded connection 1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] Welded florage raised face	C 0 F 0 K 0 L 0
Welded flange, raised face 1½", ASME, 150 lb 1½", ASME, 300 lb 1½", ASME, 600 lb 2", ASME, 150 lb 2", ASME, 600 lb 3", ASME, 150 lb 3", ASME, 150 lb 3", ASME, 300 lb 6", ASME, 150 lb 6", ASME, 150 lb 6", ASME, 300 lb 6", ASME, 300 lb	B 1 B 2 B 3 C 1 C 2 C 3 D 1 D 2 D 3 E 1 E 2 E 3
6", ASME, 300 lb <sup>3</sup> ) 6", ASME, 600 lb <sup>3</sup> ) Welded flange, Type A flat faced DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 <sup>3</sup> ) DN 100, PN 16 <sup>3</sup> ) DN 100, PN 40 <sup>3</sup> ) DN 125, PN 16 <sup>3</sup> ) DN 125, PN 40 <sup>3</sup> ) (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	F 2 F 3 K 4 K 5 L 4 L 5 M 4 M 5 N 4 N 5 P 4 P 5

Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange with Cable Sensor	7ML5513-
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
Approvals	
General Purpose: CE, CSA, FM, RCM CSA / FM Class I, Div. 2, Groups A, B, C, D CSA / FM Class II, III, Div. 1, Groups E, F, G T4 ATEX II 3G 2D EEx nA [ib] IIC T6 T4 T 100 °C ATEX II 1/2 GD EEx d [ia] IIC T6 T1 T 100 °C	1 2 4
FM Class I, Div.1, Groups A, B, C, D, T4	6
Enclosure/Cable inlet	
Aluminum epoxy coated	
2 x ½" NPT, IP68 2 x M20x1.5 (IP68, adapter)	1 2
Options	_
No additional options With mounting eye <sup>4)</sup>	A B
Thermal isolator	
Without thermal isolator Isolator, only for use when temperature range is outside of -40 +85 °C (-40 +185 °F), explosion proof approval -40 +70 °C (-40 +158 °F)	A B
Electronic output 2-wire loop current 4 20 mA (transmitter MSP 2002-2 _3300 pF)	1
1) A minimum span of 3 pE must be maintained	

- $^{1)}\,$  A minimum span of 3 pF must be maintained
- <sup>2)</sup> Available with non-conductive media only
- <sup>3)</sup> Custom shipping methods required. Contact factory for more details.
- 4) Available in PFA insulated version only

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	See page 4/347
Accessories	See page 4/347

# Continuous level measurement - Capacitance transmitters

	A .: 1 A1
Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange,	7ML5515-
with Rod Sensor Inverse frequency shift capacitance level and	
interface transmitter for extreme and critical	
process conditions, such as oil and liquid gas,	
toxic and aggressive chemicals and vapours.	
tion in the PIA Life Cycle Portal.	
Version	
Rod, 16 mm (0.63 inch), PFA insulated	
Add Order code Y01 and Y02 and plain text:	
"Insertion length mm and active shield	
length mm <sup>#</sup>	
200 1 000 mm (7.87 39.37 inch) <sup>1)</sup>	0 A
1 001 2 000 mm (39.41 78.74 inch)	1 A
2 001 3 000 mm (78.78 118.11 inch) <sup>2)</sup>	2 A
3 001 3 500 mm (118.15 137.80 inch) <sup>2)</sup>	3 A
Rod, 16 mm (0.63 inch), PFA insulated with 35 mm	
(1.38 inch) stilling well in 316L stainless steel	
Add Order code Y01 and Y02 and plain text:	
"Insertion length mm and active shield	
length mm" 200 1 000 mm (7.87 39.37 inch) <sup>1)3)</sup>	0 B
1 001 2 000 mm (39.41 78.74 inch) <sup>3)</sup>	1 B
2 001 3 000 mm (78.78 118.11 inch) <sup>2)3)</sup>	2 B
3 001 3 500 mm (118.15 137.80 inch) <sup>2)3)</sup>	3 B
Rod, 24 mm (0.94 inch), PFA insulated	
Add Order code Y01 and Y02 and plain text:	
Add Order code Y01 and Y02 and plain text: "Insertion length mm and active shield	
length mm"	
200 1 000 mm (7.87 39.37 inch) <sup>4)</sup>	0 C
1 001 2 000 mm (39.41 78.74 inch) <sup>4)</sup>	1 C
2 001 3 000 mm (78.78 118.11 inch) <sup>2)4)</sup> 3 001 4 000 mm (118.15 157.48 inch) <sup>2)4)</sup>	2 C 3 C
4 001 5 000 mm (173.26 196.88 inch) <sup>2)4)</sup>	4 C
5 001 5 500 mm (196.89 216.54 inch) <sup>2)4)</sup>	5 C
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm	30
(1.89 inch) stilling well in 316L stainless steel	
Add Order code Y01 and Y02 and plain text:	
"Insertion length mm and active shield	
length mm"	
200 1 000 mm (7.87 39.37 inch) <sup>5)</sup>	0 D
1 001 2 000 mm (39.41 78.74 inch) <sup>5)</sup>	1 D
2 001 3 000 mm (78.78 118.11 inch) <sup>2)5)</sup> 3 001 4 000 mm (118.15 157.48 inch) <sup>2)5)</sup>	2 D 3 D
4 001 5 000 mm (173.26 196.88 inch) <sup>2)5)</sup>	4 D
5 001 5 500 mm (196.89 216.54 inch) <sup>2)5)</sup>	5 D
Process connection (316L stainless steel)	
Threaded connection `	
34" NPT [(Taper), ANSI/ASME B1.20.1]	A 0
1" NPT [(Taper), ANSI/ASME B1.20.1]	B 0
1½" NPT [(Taper), ANSI/ASME B1.20.1] 2" NPT [(Taper), ANSI/ASME B1.20.1]	C 0 D 0
R 34" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	E 0
R 1" [(BSPT), EN 10226/PT (JIS-1), JIS B 0203]	F 0
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	J 0
R 2" [(BSPT), ÉN 10226/PT (JIS-T), JIS B 0203]	K 0
11/4" NPT [(Taper), ANSI/ASME B1.20.1]	N 0
G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	P 0
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	R 0
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	S 0
G 2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	Т 0
= [, = 0 ], =	

	A .: 1 A1
Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange, with Rod Sensor	7ML5515-
Inverse frequency shift capacitance level and	
interface transmitter for extreme and critical process conditions, such as oil and liquid gas,	
toxic and aggressive chemicals and vapours.	
Welded flange, raised face	
1½", ASME, 150 lb 1½", ASME, 300 lb 1½", ASME, 600 lb	B 1 B 2
1½", ASME, 600 lb	B 3
2", ASME, 150 lb	C 1
2", ASME, 300 lb 2", ASME, 600 lb	C 2 C 3
	D 1
3", ASME, 150 lb <sup>2)</sup> 3", ASME, 300 lb <sup>2)</sup> 3", ASME, 600 lb <sup>2)</sup>	D 2
3", ASME, 600 ID=7	D 3
4", ASME, 150 lb <sup>2)</sup> 4", ASME, 300 lb <sup>2)</sup>	E 1 E 2
4", ASME, 600 lb <sup>2</sup> /	E 3
6", ASME, 150 lb <sup>2)</sup> 6" ASME 300 lb <sup>2)</sup>	F 1 F 2
6", ASME, 300 lb <sup>2</sup> ) 6", ASME, 600 lb <sup>2</sup> )	F 3
Welded flange, Type A flat faced	
DN 40, PN 16	K 4
DN 40, PN 40 DN 50, PN 16	K 5 L 4
DN 50, PN 40	L 5
DN 80, PN 16	M 4
DN 80, PN 40 <sup>2)</sup>	M 5
DN 100, PN 16 <sup>2)</sup> DN 100, PN 40 <sup>2)</sup>	N 4 N 5
DN 125. PN 16 <sup>2)</sup>	P 4
DN 125, PN 40 <sup>2)</sup> (Note: Flange bolting patterns and facings	P 5
dimensionally correspond to the applicable	
ASME B16.5, or EN 1092-1 standard.)	
Approvals	1
General Purpose: CE, CSA, FM, RCM CSA / FM Class I, Div. 2, Groups A, B, C, D	2
CSA / FM Class II, III, Div. 1, Groups E, F, G T4	
ATEX II 3G 2D EEx nA [ib] IIC T6 T4 T 100 °C ATEX II 1/2 GD EEx d [ia] IIC T6 T1 T 100 °C	4
FM Class I, Div.1, Groups A, B, C, D, T4	6
Enclosure/Cable inlet	_
Aluminum epoxy coated	,
2 x ½" NPT, IP68 2 x M20 x1.5 (IP68, adapter)	1 2
Options	
No additional options	A
Thermal isolator/remote version Without thermal isolator or remote electronics	А
Thermal isolator, only for use when temperature	В
range is outside of -40 +85 °C (-40 +185 °F), explosion proof approval -40 +70 °C	
(-40 +158 °F)	
Remote electronics with mounting bracket and	
cable <sup>6)</sup>	
<ul><li>Length: 2 m (79 inch)</li><li>Length: 3 m (118 inch)</li></ul>	C D
• Length: 4 m (158 inch)	E
• Length: 5 m (197 inch)	F
Electronic output	
2-wire loop current 4 20 mA	1
(transmitter MSP 2002-2 _3300 pF)	

<sup>1)</sup> A minimum span of 3 pF must be maintained

<sup>2)</sup> Custom shipping methods required. Contact factory for more details.

 $<sup>^{3)}</sup>$  Available with process connection 1%" or larger

<sup>4)</sup> Available with process connection 1" or larger

 $<sup>^{5)}\,</sup>$  Available with process connection 2 " or larger

<sup>6)</sup> Available with approval option 1 only

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: mm	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturing Test Report (Electrode Test)	C18
Operating Instructions	See page 4/34
Accessories	See page 4/34

Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Article No.
SITRANS LC500, Single Piece Flanged with	7ML5517-
Rod Sensor  Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.   ✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version	
Rod, 16 mm (0.63 inch), PFA insulated Add Order code Y01 and Y02 and plain text:  "Insertion length mm and active shield length mm" 250 1 000 mm (9.84 39.37 inch) <sup>1)</sup> 1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) <sup>2)</sup> 3 001 3 500 mm (118.15 137.80 inch) <sup>2)</sup> Rod, 16 mm (0.63 inch), PFA insulated with 35 mm (1.34 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text:  "Insertion length mm and active shield length mm	0 A 1 A 2 A 3 A
length mm" 250 1 000 mm (9.84 39.37 inch)	0 B
1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) <sup>2)</sup> 3 001 3 500 mm (118.15 137.80 inch) <sup>2)</sup>	1 B 2 B 3 B
Rod, 24 mm (0.94 inch), PFA insulated Add Order code Y01 and Y02 and plain text: "Insertion length mm and active shield length mm" 250 1 000 mm (9.84 39.37 inch)	0 C
1 001 2 000 mm (39.41 78.74 inch) 2 001 3 000 mm (78.78 118.11 inch) <sup>2)</sup> 3 001 4 000 mm (118.15 157.48 inch) <sup>2)</sup> 4 001 5 000 mm (173.26 196.88 inch) <sup>2)</sup> 5 001 5 500 mm (196.89 216.54 inch) <sup>2)</sup>	1 C 2 C 3 C 4 C 5 C
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm (1.89 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text:  "Insertion length mm and active shield length mm"  250 1 000 mm (9.84 39.37 inch)	0 D
1 001 2 000 mm (39.41 78.74 inch) <sup>2)3)</sup> 2 001 3 000 mm (78.78 118.11 inch) <sup>2)3)</sup> 3 001 4 000 mm (118.15 157.48 inch) <sup>2)3)</sup> 4 001 5 000 mm (173.26 196.88 inch) <sup>2)3)</sup> 5 001 5 500 mm (196.89 216.54 inch) <sup>2)3)</sup>	1 D 2 D 3 D 4 D 5 D
Process connection (316L stainless steel) Single piece flange, raised face	
1½", ASME, 150 lb 1½", ASME, 300 lb 1½", ASME, 600 lb	B 1 B 2 B 3
2", ASME, 150 lb 2", ASME, 300 lb 2", ASME, 600 lb	C 1 C 2 C 3
3", ASME, 150 lb <sup>2)</sup> 3", ASME, 300 lb <sup>2)</sup> 3", ASME, 600 lb <sup>2)</sup>	D 1 D 2 D 3
4", ASME, 150 lb <sup>2)</sup> 4", ASME, 300 lb <sup>2)</sup> 4", ASME, 600 lb <sup>2)</sup>	E 1 E 2 E 3
6", ASME, 150 lb <sup>2)</sup> 6", ASME, 300 lb <sup>2)</sup> 6", ASME, 600 lb <sup>2)</sup>	F 1 F 2 F 3

Selection and Ordering data	Article No.
SITRANS LC500, Single Piece Flanged with Rod Sensor	7ML5517-
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
Single piece flange, Type B1 raised face	
DN 40, PN 16	K 4
DN 40, PN 40	K 5
DN 50, PN 16	L 4
DN 50, PN 40	L 5
DN 80, PN 16	M 4
DN 80, PN 40 <sup>2)</sup>	M 5
DN 100, PN 16 <sup>2)</sup>	N 4
DN 100, PN 40 <sup>2)</sup>	N 5
DN 125, PN 16 <sup>2)</sup>	P 4
DN 125, PN 40 <sup>2)</sup>	P 5
Single piece flange with PTFE flange facing (applicable with versions 0A 3A and 0C 5C) <sup>4)</sup>	
1½" ASME, 150 lb	B 4
1½", ASME, 300 lb	B 5
1½", ASME, 600 lb	B 6
2", ASME, 150 lb	C 4
2", ASME, 300 lb	C 5
2", ASME, 600 lb	C 6
3", ASME, 150 lb <sup>2)</sup>	D 4
3", ASME, 300 lb <sup>2)</sup>	D 5
3", ASME, 600 lb <sup>2)</sup>	D 6
4", ASME, 150 lb <sup>2)</sup> 4", ASME, 300 lb <sup>2)</sup> 4", ASME, 600 lb <sup>2)</sup>	E 4 E 5 E 6
6", ASME, 150 lb <sup>2)</sup> 6", ASME, 300 lb <sup>2)</sup> 6", ASME, 600 lb <sup>2)</sup>	F 4 F 5 F 6
Single piece flange with PTFE flange facing (applicable with versions 0A 3A, 0C 5C) <sup>4)</sup>	
DN 40, PN 16	K 6
DN 40, PN 40	K 7
DN 50, PN 16	L 6
DN 50, PN 40	L 7
DN 80, PN 16	M 6
DN 80, PN 40 <sup>2)</sup>	M 7
DN 100, PN 16 <sup>2)</sup>	N 6
DN 100, PN 40 <sup>2)</sup>	N 7
DN 125. PN 16 <sup>2)</sup>	P 6
DN 125, PN 40 <sup>2)</sup> (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	P 7

# Continuous level measurement - Capacitance transmitters

7ML5517- 1 2 4 6
2 4 6
2 4 6
1
-

1)	Α	minimum	span of	f 3 pF	must be	maintained
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Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: mm	Y01
Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: mm	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturing Test Report (Electrode Test)	C18
Operating Instructions	See page 4/347
Accessories	See page 4/347

Custom shipping methods required. Contact factory for more details.
 Available with process connection 2" or larger, and only available with process connection options C1 ... F3, L4 ... P5

<sup>4)</sup> Not available with versions 0E and 0F

<sup>5)</sup> Available with approval option 1 only

# Continuous level measurement - Capacitance transmitters

Selection and Ordering data	Arti	cle No.
SITRANS LC500, Extended Cable version with		L5523-
Rod Sensor, threaded connection or welded flange <sup>1)</sup>		
Inverse frequency shift capacitance level and		
interface transmitter for short range continuous measurement in large storage vessels.		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.       Output     Description     Click on the Article No. for the online configuration in the PIA Life Cycle Portal.      Output     Description     Click on the Article No. for the online configuration in the PIA Life Cycle Portal.      Output     Description     Click on the Article No. for the online configuration in the PIA Life Cycle Portal.      The Article No. for the online configuration in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the PIA Life Cycle Portal.      The Article No. for the Output     Description in the Output     Descr		
Version <sup>2)</sup>		
Rod, 16 mm (0.63 inch), PFA insulated and 316L stainless steel flexible extension tube		
Total insertion length:		
Add Order code Y01 and plain text: "Total insertion length mm and Y02 and plain text:		
Active shield length mm" <sup>3)4)</sup>		
• 5 000 10 000 mm (196.85 393.70 inch) <sup>1)</sup> • 10 001 15 000 mm (393.74 590.55 inch) <sup>1)</sup>	0 A 1 A	
• 15 001 20 000 mm (590.59 787.40 inch) <sup>1)</sup>	2 A	
• 20 001 25 000 mm (787.44 984.25 inch) <sup>1)</sup> • 25 001 30 000 mm (984.29 1181.10 inch) <sup>1)</sup>	3 A 4 A	
• 30 001 35 000 mm (1 181.14 1 377.95 inch) <sup>1)</sup> Rod, 24 mm (0.94 inch), PFA insulated and 316L	5 A	
stainless steel flexible extension tube		
Total insertion length: Add Order code Y01 and plain text: "Total insertion		
length mm and Y02 and plain text: Active shield length mm <sup>13)4)</sup>		
• 5 000 10 000 mm (196.85 393.70 inch) <sup>1)</sup>	0 B	
• 10 001 15 000 mm (393.74 590.55 inch) <sup>1)</sup> • 15 001 20 000 mm (590.59 787.40 inch) <sup>1)</sup>	1 B 2 B	
• 20 001 25 000 mm (787.44 984.25 inch) <sup>1)</sup>	3 B	
• 25 001 30 000 mm (984.29 1 181.10 inch) <sup>1)</sup> • 30 001 35 000 mm (1 181.14 1 377.95 inch) <sup>1)</sup>	4 B 5 B	
Process connection (316L stainless steel) Threaded connection		
2" NPT [(Taper), ANSI/ASME B1.20.1]		A 0
R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 2" [(BSPP), EN ISO 228-1/PF (JIS-P) JIS B 0202]		B 0 D 0
Welded flange, raised face		
2", ASME, 150 lb 2", ASME, 300 lb		C 1 C 2
3". ASME. 150 lb <sup>1)</sup>		D 1
3", ASME, 300 lb <sup>1)</sup> 4", ASME, 150 lb <sup>1)</sup>		D 2 E 1
4", ASME, 300 lb <sup>1)</sup>		E 2
6", ASME, 150 lb <sup>1)</sup> 6", ASME, 300 lb <sup>1)</sup>		F 1 F 2
Welded flange, Type A flat faced		
DN 50, PN 16 DN 50, PN 40		L 4 L 5
DN 80. PN 16		M 4
DN 80, PN 40 <sup>1)</sup> DN 100, PN 16 <sup>1)</sup>		M 5 N 4
DN 100, PN 40 <sup>1)</sup>		N 5
DN 125, PN 16 <sup>1)</sup> DN 125, PN 40 <sup>1)</sup>		P 4 P 5
(Note: Flange bolting patterns and facings		
dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)		
Approvals		
General Purpose: CE, CSA, FM, RCM CSA / FM Class I, Div. 2, Groups A, B, C, D		1 2
CSA / FM Class II, III, Div. 1, Groups A, B, C, D		
ATEX II 3G 2D EEx nA [ib] IIC T6 T4 T 100 °C		
ATEX II 1/2 GD EEx d [ia] IIC T6 T1 T 100 °C		4
FM Class I, Div. 1, Groups A, B, C, D T4		6

Selection and Ordering data	Article No.
SITRANS LC500, Extended Cable version with	7ML5523-
Rod Sensor, threaded connection or welded flange <sup>1)</sup>	
Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	
Enclosure/Cable inlet Aluminum epoxy coated 2 x ½* NPT, IP68 2 x M20x1.5 (IP68, adapter)	1 2
Options No additional options With mounting eye	A B
Thermal isolator Without thermal isolator Isolator, only for use when temperature range is outside of -40 +85 °C (-40 +185 °F), explosion proof approval -40 +70 °C (-40 +158 °F)	A B
Electronic output 2-wire loop current 4 20 mA (transmitter MSP 2002-2 _3300 pF)	1

- 1) Custom shipping methods required. Contact factory for more details.
- $^{2)}\,$  A minimum span of 3 pF must be maintained.
- $^{\rm 3)}$  See dimension drawings on page 4/356 for further explanation of Y01.
- 4) Inactive length is equal to the flexible extension plus transition. See dimension drawings on page 4/356 for further explanation of Y02.

# Continuous level measurement - Capacitance transmitters

## SITRANS LC500

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: to mm (Includes measuring range plus cable extension) - see dimensional information on page 4/356	Y01
Active shield/cable extension length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: to mm (see dimensional information on page 4/356)	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Article No.
English	7ML1998-5GE04
French	7ML1998-5GE12
Spanish	7ML1998-5GE21
German	7ML1998-5GE33
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

,	MITIANO E000
Selection and Ordering data	Article No.
Accessories	
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 6 12 mm (0.236 0.472 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40100 °C (-40212 °F), cable size 7 12 mm (0.275 0.472 inch)	7ML1830-1JC
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JB
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 12 mm (0.216 0.472 inch)	7ML1830-1JD
Transmitter, MSP 2002-1, 330 PF <sup>1)</sup>	7ML1830-1JP
Transmitter, MSP 2002-2, 3 300 PF <sup>1)</sup>	7ML1830-1JQ
Transmitter, MSP 2002-3, 6 600 PF (used with conductive fluids and probe lengths >10 000 mm) <sup>1)</sup>	7ML1830-1JR
SITRANS RD100, loop powered display - see Chapter 7	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750
For applicable back up point level switch - see point level measurement section	

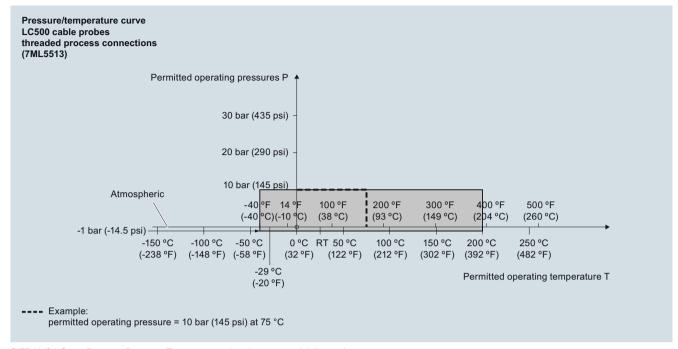
<sup>1)</sup> Transmitters not suitable for Intrinsically Safe application (ATEX II 1G EEx ia IIC T4 or CSA/FM Class 1 Div. 1 Groups A, B, C and D

Please contact ceg.smpi@siemens.com for special requests.

Continuous level measurement - Capacitance transmitters

## SITRANS LC500

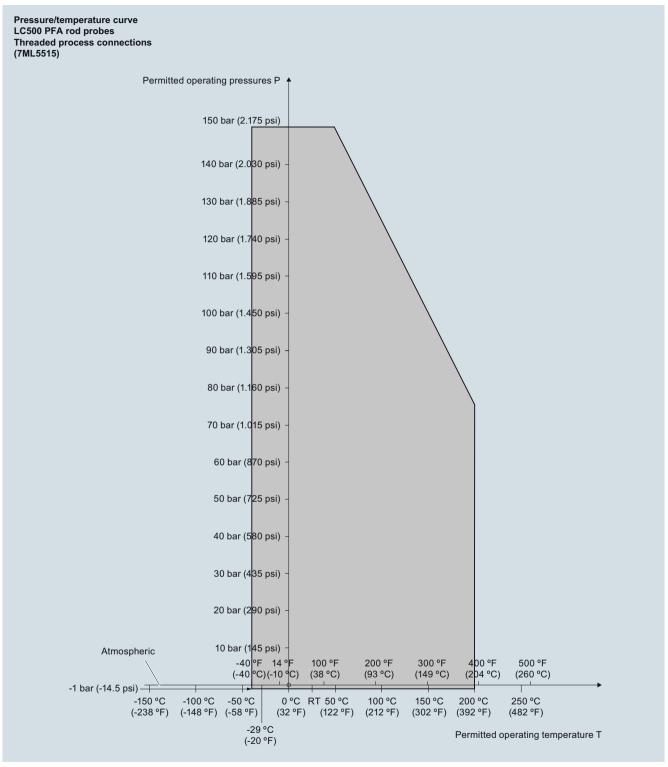
## Characteristic curves



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Continuous level measurement - Capacitance transmitters

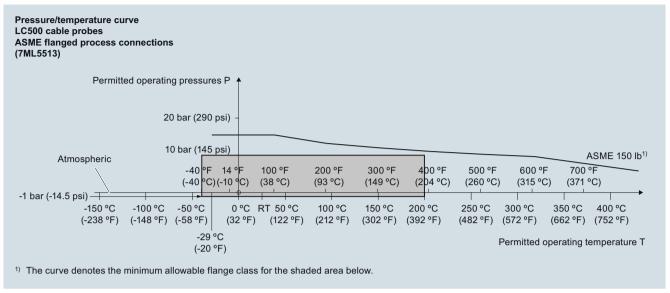
SITRANS LC500



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515)

Continuous level measurement - Capacitance transmitters

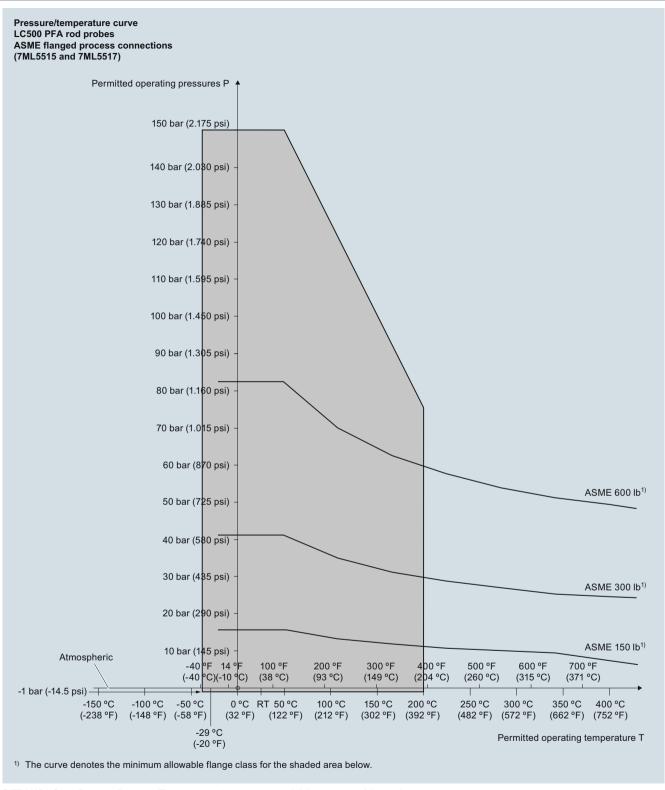
#### **SITRANS LC500**



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Continuous level measurement - Capacitance transmitters

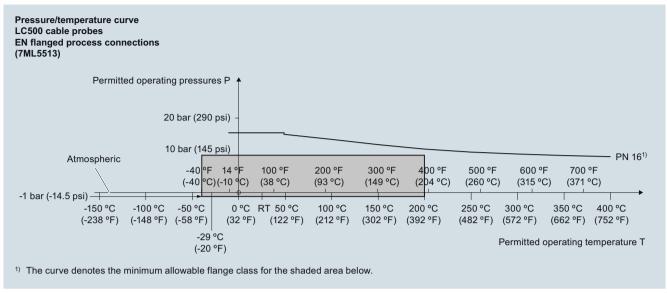
**SITRANS LC500** 



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Continuous level measurement - Capacitance transmitters

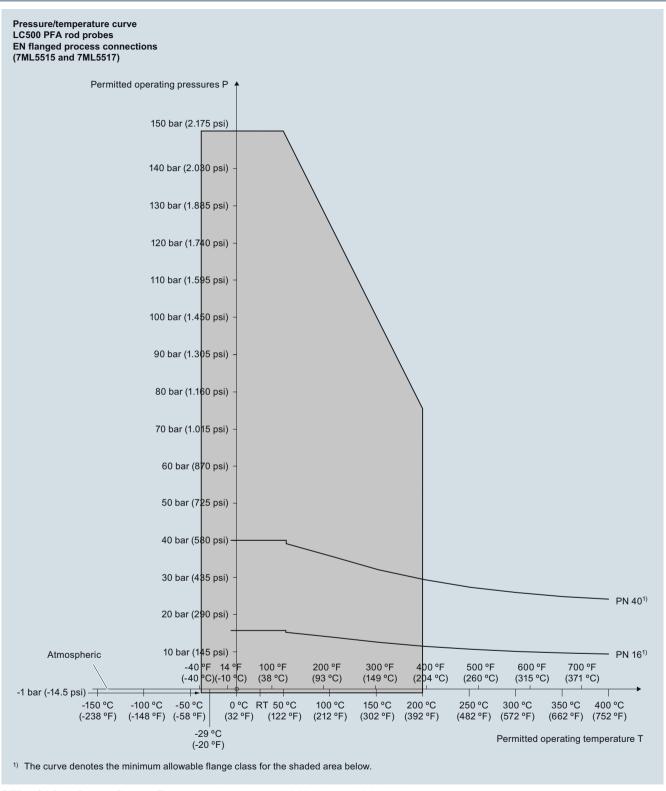
#### **SITRANS LC500**



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Continuous level measurement - Capacitance transmitters

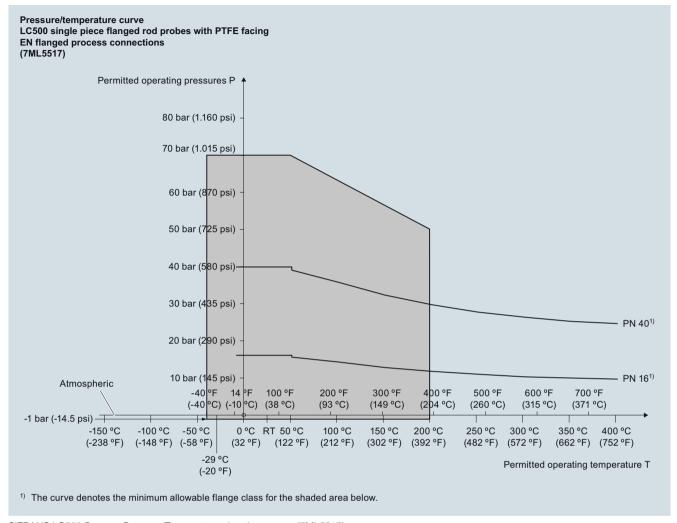
**SITRANS LC500** 



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Continuous level measurement - Capacitance transmitters

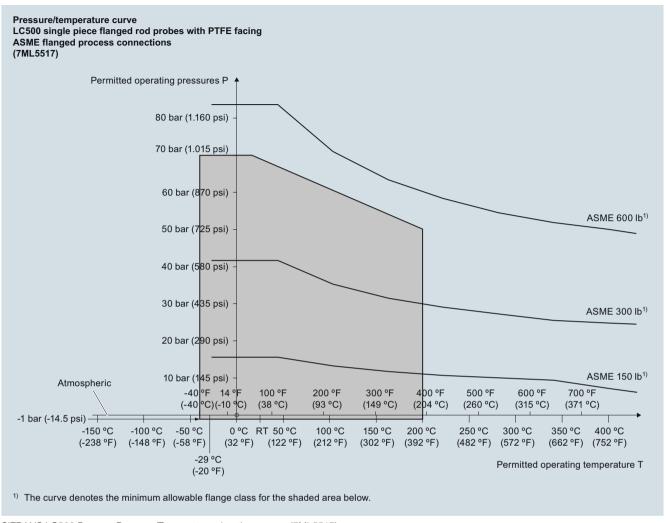
#### **SITRANS LC500**



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

Continuous level measurement - Capacitance transmitters

**SITRANS LC500** 

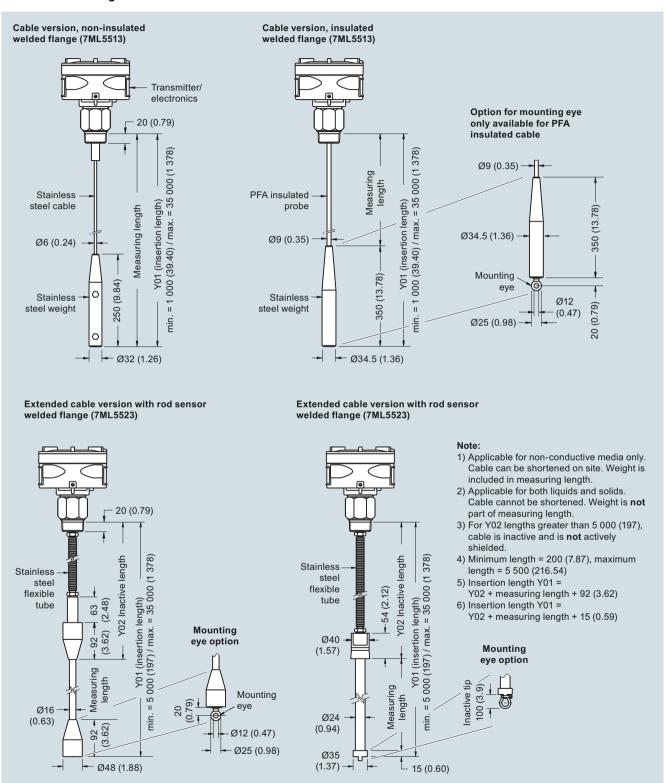


SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

Continuous level measurement - Capacitance transmitters

#### **SITRANS LC500**

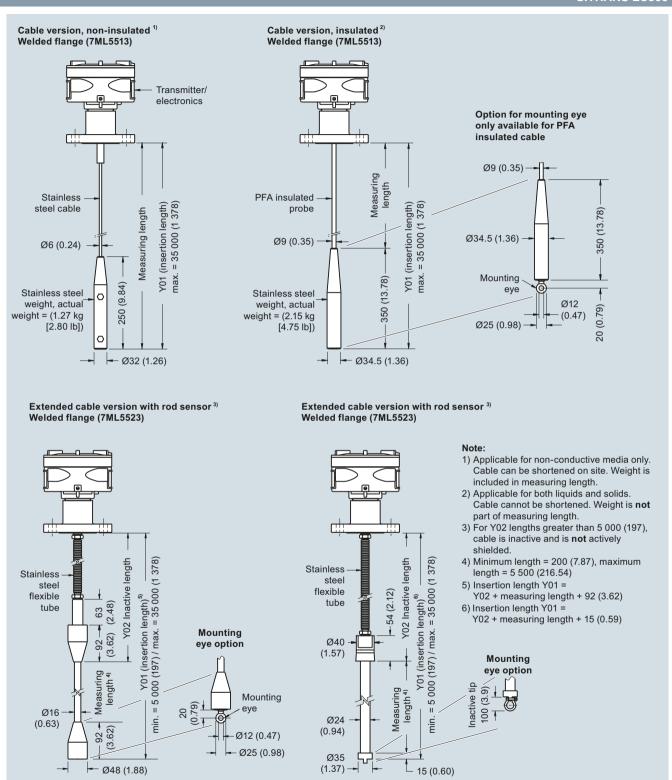
#### Dimensional drawings



SITRANS LC500 - Cable Versions, dimensions in mm (inch)

#### Continuous level measurement - Capacitance transmitters

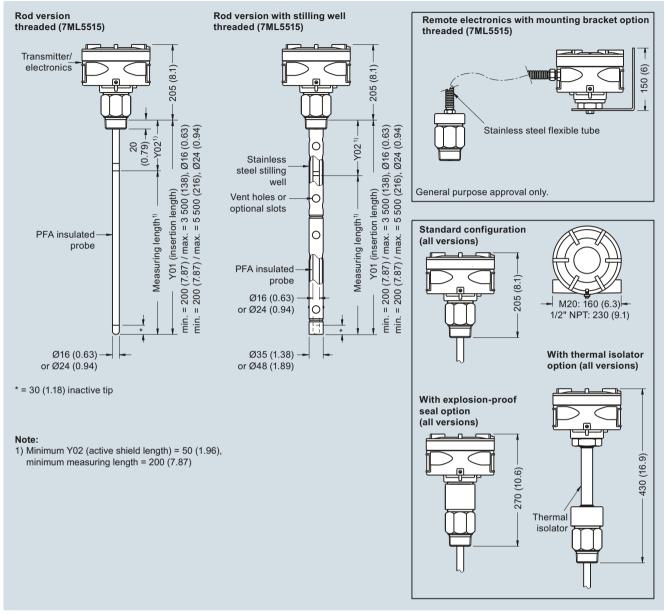
#### **SITRANS LC500**



SITRANS LC500 - Cable Versions, dimensions in mm (inch)

Continuous level measurement - Capacitance transmitters

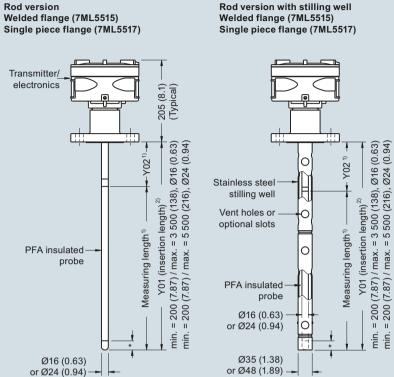
#### SITRANS LC500

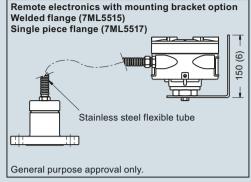


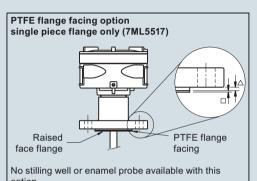
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

#### Continuous level measurement - Capacitance transmitters

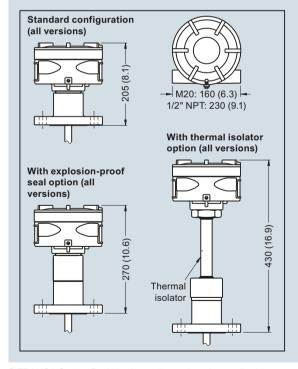
#### SITRANS LC500







\* = 30 (1.18) inactive tip



Flange facing (raised face)			
Flange class Facing thickness			
△ ASME 150/300	2 (0.08)		
△ ASME 600/900	7 (0.28)		
△ PN16/25/40/64 2 (0.08)			
□ PTFE facing (additional) 2 (0.08)			

#### Notes:

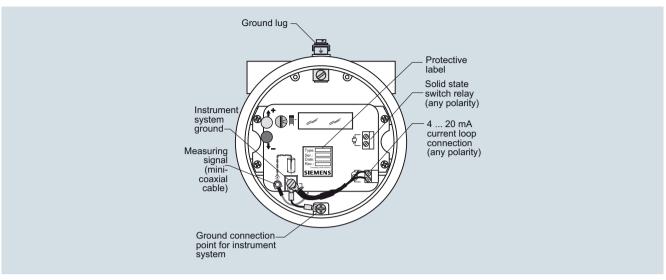
- 1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)
- Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).

SITRANS LC500 - Rod Versions, dimensions in mm (inch)

Continuous level measurement - Capacitance transmitters

#### **SITRANS LC500**

## Schematics



SITRANS LC500 connections

## Continuous level measurement - Capacitance transmitters

## SITRANS LC300 and LC500 Specials

Selection and ordering data			
LC300 and LC500 Specials <sup>1)</sup>		LC300 and LC500 Specials <sup>1)</sup>	
	Article No.		Article No.
LC300 Cable Extensions, 316L stainless steel		LC300 Mounting Eye	
	0	Spare mounting eye (LC300 PFA versions only)	A5E01163717
	<u> </u>	LC300 Weight Kit, 316L stainless steel	
Kit, stainless steel cable extension, 1 m, adjustable by customer	A5E01163688		
Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689		
Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690	Kit Coore stricters the lovelight Tells word in	AFF04460707
Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691	Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300	A5E01163727
Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693	LC500 Gasket (IP65), Silicone	
Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695		
LC300 Cable Extensions, 316 stainless steel with PFA coating			
oro stainless steel with Fra coating		Spare gasket, LC500 enclosure version, IP65	A5E01163728
	#	LC500 Blind Lid	A0201100720
Kit, PFA cable extension, 1 m	A5E01163709	Spare LC500 aluminum blind lid	A5E01163729
Kit, PFA cable extension, 3 m	A5E01163710	LC500 Mounting Eye	
Kit, PFA cable extension, 5 m	A5E01163711		
Kit, PFA cable extension, 10 m	A5E01163712		
Kit, PFA cable extension, 15 m	A5E01163713	Spare mounting eye (PFA cable version only)	A5E01163717
Kit, PFA cable extension, 20 m	A5E01163714	LC500 Mounting Bracket	
		Spare mounting bracket	A5E01163730
		LC500 Sanitary Versions <sup>2)</sup>	<b></b>

 $\label{prop:prop:prop:prop:prop:general} Please \ contact \ ceg.smpi@siemens.com \ for \ special \ requests.$ 

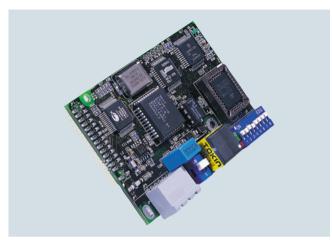
Special flange sizes and facings are available. Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/11.

Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/11.

#### Communication

#### SmartLinx module

#### Overview



SmartLinx modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

#### Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scaleable application layer allows for optimized network bandwidth and memory requirements
- Modules available for PROFIBUS DP, DeviceNet

#### Application

Many Siemens products include HART, PROFIBUS PA and Modbus communications. For additional communication modules, SmartLinx cards are the answer.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinx-enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinx provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

Module type	PROFIBUS DP
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps 12 Mbps
<ul> <li>Rack address</li> </ul>	0 99
<ul> <li>Connection</li> </ul>	Slave
SmartLinx module compatibility	<ul><li>MultiRanger 100/200</li><li>HydroRanger 200</li></ul>

Module type	DeviceNet
Interface	DeviceNet physical layer
<ul> <li>Transmission rate in kbps</li> </ul>	125, 250, 500
Rack address	0 63
Connection	Slave (group 2)
SmartLinx module compatibility	<ul><li>MultiRanger 100/200</li><li>HydroRanger 200</li></ul>

Selection and Ordering data	Article No.
SmartLinx module for MultiRanger 100/200 and HydroRanger 200	
PROFIBUS DP module	7ML1830-1HR
DeviceNet module	7ML1830-1HT
Operating Instructions	
PROFIBUS communications module	
• English	7ML1998-1AQ03
• French	7ML1998-1AQ13
• German	7ML1998-1AQ33
DeviceNet This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operat- ing Instructions.	
• English	7ML1998-1BH02
• French	7ML1998-1BH12
Spare SmartLinx software	
PROFIBUS DP data diskette	7ML1830-1CL
DeviceNet data diskette	7ML1830-1CM

Communication

**Dolphin Plus Software** 

#### Overview



Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens level devices remotely (see list below). Remote access is available using your desktop PC or connected directly in the field using a laptop.

#### Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- Saving and visualization of echo profiles for a wide range of Siemens level meters
- Copying of data for programming several devices
- · Quick setup and commissioning of device
- Generation of configuration reports within seconds

The Dolphin Plus software is only available in English.

#### Application

Dolphin Plus is easy to install and use. Just load the software from the CD. In minutes, you're ready to set up or modify complete parameter configurations for one or more devices.

Following configuration, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments. Reading of echo profiles permits fine tuning without the need for special instruments. Built-in quick start wizards and help functions guide you through the entire process.

#### Compatibility

Dolphin Plus is compatible with Microsoft Windows 95/98/NT4/Me/2000/XP and works with a wide range of Siemens products, including:

- SITRANS LU10
- SITRANS LU02
- SITRANS LU01

Connection to a Siemens instrument may be a direct RS 232 serial connection or via an RS 485 converter or Siemens infrared ComVerter, depending on the instrument being configured.

Meets VDE 2187 user interface requirements.

(Most other Siemens level devices use Simatic PDM configuration software.)

Selection and Ordering data	Article No.
Dolphin Plus	7ML1841-
Instrument configuration software to quickly and easily configure, monitor, tune and diagnose most Siemens devices remotely, from your desktop PC or connected directly in the field using a laptop.	<b>AAO</b>
Dolphin Plus Software includes a software DVD, and a nine pin adapter with a 2.1 m (82.7 inch) cable for connection to a PC serial port.	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
RS 485 to RS 232 converter	
No	0
Yes	1
ComVerter	
No	0
Yes	1

Selection and Ordering data	Article No.
Operating Instructions	
Connection manual, English: Included on Dolphin Plus DVD and available at www.siemens.com/processautomation	
Spare parts	
Converter, RS 485 to RS 232 (D-Sub)	7ML1830-1HA
Kit containing one 9-pin D-Sub to RJ11 Adapter and one 2.1 meter telephone cable with two male jacks	7ML1830-1MC
ComVerter, Infrared link	7ML1830-1MM

Communication

Notes

# 5

## **Positioners**



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HART and PROFIBUS PA devices

You can download all instructions, catalogs and certificates for positioners free of charge at the following Internet address: www.siemens.com/positioners

# **Positioners**

# **Product Overview**

# Overview

	Application	Description	Catalog page	Software for parameteriza- tion
Positioners				
	Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation	SIPART PS2	5/3	SIMATIC PDM
		Universal device for positioning pneumatic actuators		
		Connection: 4 to 20 mA		
		<ul> <li>HART, PROFIBUS PA or FOUNDATION Fieldbus</li> </ul>		
		Local manual operation		
		Binary inputs and outputs		
		Diagnostic function		
		Blocking function		
		Automatic startup		
	As above, but in flameproof enclo-	SIPART PS2	5/3	SIMATIC PDM
CIO	sure for explosion-proof application	As above, but in flameproof aluminum enclosure		

#### Overview



Electropneumatic positioner SIPART PS2 in the aluminum enclosure



SIPART PS2 electropneumatic positioner in flameproof aluminum enclosure with manometers



SIPART PS2 in stainless steel enclosure with manometers

The SIPART PS2 electropneumatic positioner is used to control the final control element of pneumatic linear or part-turn actuators. The electropneumatic positioner moves the actuator to a valve position corresponding to the setpoint. Additional function inputs can be used to block the valve or to set a safety position. A binary input is present as standard in the basic device for this purpose.

#### Benefits

SIPART PS2 positioners offer decisive advantages:

- Simple installation and automatic commissioning (self-adjustment of zero and span)
- Simple operation with
  - Local operation (manual operation) and configuration of the device using three buttons and a user-friendly two-line display
  - Parameterization via SIMATIC PDM
- Very high-quality control thanks to an online adaptation procedure
- Negligible air consumption in stationary operation
- "Tight closing" function (ensures maximum positioning pressure on the valve seat)
- "Fail in place" function: Current position is retained on electrical power failure (does not apply in conjunction with SIL)
- Numerous functions can be activated by simple configuring (e. g. characteristic curves and limits)
- Extensive diagnostic functions for valve and actuator
- Only one device version for linear and part-turn actuators
- Few moving parts, hence insensitive to vibrations
- External non contacting sensor as option for extreme ambient conditions
- "Intelligent solenoid valve": Partial Stroke Test and solenoid valve function in one device
- Partial Stroke Test e. g. for safety valves
- Full Stroke Test, Multi Step Response Test, Valve Performance Test for performance and maintenance evaluation of the valve
- Can also be operated with purified natural gas, carbon dioxide, nitrogen or noble gases
- SIL (Safety Integrity Level) 2

#### Application

The SIPART PS2 positioner is used, for example, in the following industries:

- Chemical/petrochemical
- Power stations
- · Paper and glass
- · Water, waste water
- Food and pharmaceuticals
- Offshore plants

The SIPART PS2 positioner is available:

- For single-acting actuators: In Makrolon, stainless steel or aluminum enclosure, as well as flameproof aluminum enclosure
- For double-acting actuators: In Makrolon enclosure, stainless steel enclosure and flameproof aluminum enclosure
- For non-hazardous applications
- For hazardous applications in the versions
  - Intrinsic safety type of protection
  - Flameproof enclosure type of protection
  - Non-sparking type of protection
- Dust protection by enclosure type of protection

#### and in the versions:

- With 0/4 ... 20 mA control with/without communication through HART signal
- With PROFIBUS PA communication interface
- With FOUNDATION Fieldbus (FF) communications interface

#### **Positioners**

#### SIPART PS2

#### **Technical description**

#### Explosion-proof versions

- Device with protection type "intrinsic safety" for use in Zone 1, 2, 21, 22 or Class I, II, III/Division 1/Groups A-G
- Device with protection type "dust protection with enclosure" for use in Zone 21, 22 or Class II, III/Division 1/Groups E-G
- Device with protection type "non-sparking" for use in Zone 2 or Class I, Division 2, Groups A-D
- Device with protection type "flameproof enclosure" for use in Zone 1 or Class I, Division 1, Groups A-D

#### Stainless steel enclosure for extreme ambient conditions

The SIPART PS2 is available in a stainless steel enclosure (with no window in the cover) for use in particularly aggressive environments (e.g. offshore operation, chlorine plants etc.). The device functions are the same as for the basic version.

#### Design

The SIPART PS2 positioner is a digital field device with a highly-integrated microcontroller.

The positioner consists of the following components:

- Enclosure and cover
- PCB with corresponding electronics with or without communication through HART 7
  - or with electronics for communication in accordance with
  - PROFIBUS PA specification, IEC 61158-2; bus-supplied device, or
  - FOUNDATION Fieldbus (FF) specification, IEC 61158-2, bus-supplied device
- Position detection system
- · Terminal housing with screw terminals
- Pneumatic valve manifold with piezoelectric valve precontrol.

The valve manifold is located in the housing, the pneumatic connections for the inlet air and the positioning pressure on the right-hand side. A pressure gauge block and/or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit. The circuit board container in the casing provides slots for separately ordered boards with the following functions:

#### Position feedback module

• Position feedback as a two-wire signal 4 to 20 mA

#### Alarm module (3 outputs, 1 input)

- Signaling of two limits of the travel or angle by binary signals.
   The two limits can be set independently as maximum or minimum values
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device fault occurs.
- Second binary input for alarm signals of for triggering safety reactions, e. g. blocking function or safety position.

#### Limit signaling through slot-type initiators (SIA module)

Two limits can be signaled redundantly as NAMUR signals (EN 60947-5-6) by slot-type initiators. An alarm output is also integrated in the module (see "Alarm Module").

# Limit value signal via mechanical contacts (mechanical limit switch module)

Two limits can be signaled redundantly by switching contacts. An alarm output is also integrated in the module (see "Alarm Module").

#### Valid for all modules described above:

All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

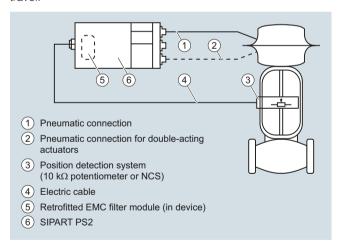
# Separate mounting of position detection system and controller unit

The position detection system and controller unit can be connected separately for all casing versions of the SIPART PS2 (except flameproof design). Measurement of the travel or angle is carried out directly on the actuator. The controller unit can then be fitted a certain distance away, e. g. on a mounting pipe or similar, and is connected to the position detection system by an electric cable and to the actuator by one or two pneumatic lines. Such a split design is frequently advantageous if the ambient conditions at the fitting exceed the specified values for the positioner (e. g. strong vibrations).

The following can be used for measuring the travel or angle:

- NCS sensor
- External position detection system C73451-A430-D78
- A commercially available potentiometer (10 kΩ resistance),
   e. g. for higher application temperatures or customer-specific applications

The use of potentiometers is recommended for very small linear actuators with a short valve travel since, on the one hand, the space required by the potentiometer is very small and, on the other, the transmission characteristic is optimum for a small travel



Separate mounting of position detection system and controller unit

#### Non contacting sensor (NCS)



NCS for part-turn actuator (6DR4004-.N.10) mounted with mounting console (left) and NCS for linear actuator ≤ 14 mm (0.55 inch) (6DR4004-.N.20) mounted with actuator-specific mounting solution (right)

#### **Technical description**



NCS (6DR4004-.N.30) for travels > 14 mm (0.55 inch) mounted using mounting kit for NAMUR linear actuator

The NCS sensor consists of a non-contacting position sensor. All coupling elements are omitted such as coupling wheel and driver pin with part-turn actuators or lever and pick-up bracket with linear actuators for up to 14 mm travel.

This results in:

- Even greater resistance to vibration and shock
- · No wear of sensor
- · Problem-free mounting on very small actuators
- · Negligible hysteresis with very small travels.

The sensor does not require an additional power supply, i. e. SIPART PS2 (not for Ex d version) can be operated in a 2-wire system. The NCS (Non Contacting Sensor) consists of a potted sensor housing which must be mounted permanently and a magnet which is mounted on the spindle of linear actuators or on the shaft butt of part-turn actuators. For the version for travels >14 mm (0.55 inch), the magnet and the NCS are premounted on a stainless steel frame and offer the same interface mechanically as the positioner itself, i. e. they can be mounted using the standard mounting kits 6DR4004-8V, -8VK and -8VL.

The installation of a EMC filter module in the positioner (controller unit) is necessary in order to ensure a connection level with EMC according to EC Declaration of Conformity when using external sensors (see "Selection and Ordering Data", "EMC Filter Module").

#### Function

The SIPART PS2 positioner works in a completely different way to normal positioners.

#### Mode of operation

Comparison of the setpoint and the actual value takes place electronically in a microcontroller. If the microcontroller detects a deviation, it uses a 5-way switch procedure to control the piezo-electric valves, which regulates the flow of air into and from the chambers of the pneumatic actuator or blows it in the opposite direction.

The microcontroller then outputs an electric control command to the piezoelectric valve in accordance with the size and direction of the deviation (deviation between setpoint and actual values). The piezoelectric valve converts the command into a pneumatic positional increment.

The positioner outputs a continuous signal in the area where there is a large system deviation (fast step zone); in areas of moderate system deviation (slow step zone) it outputs a sequence of pulses. No positioning signals are output in the case of a small system deviation (adaptive or variable deadband).

The linear or rotary motion of the actuator is detected by the mounting kit and transferred to a high-quality potentiometer over a shaft and a non-floating gear transmission.

The angular error of the pick-up in cases where the assembly is mounted on a linear actuator is corrected automatically.

When connected in a 2-wire system, the SIPART PS2 draws its power exclusively from the 4 to 20 mA setpoint signal. The electric power is also connected through the 2-wire bus signal with PROFIBUS operation (SIPART PS2 PA). The same applies for the FOUNDATION Fieldbus version.

# Pneumatic valve manifold with piezoelectric valve precontrol

The piezoelectric valve can release very short control pulses. This helps achieve a high positioning accuracy. The pilot element is a piezoelectric bending converter which switches the pneumatic main controller unit. The valve manifold is characterized by an extremely long service life.

#### Local operation

Local operation is performed using the built-in display and the three buttons. Switching between the operating levels Automatic, Manual, Configuring and Diagnosis is possible at the press of a button.

In manual mode the drive can be adjusted over the entire range without interrupting the circuit.

# Operation and monitoring with the SIMATIC PDM configuration software

The configuration software SIMATIC PDM permits simple operation, monitoring, configuration and parameterization of the device. The diagnostic information available can be read via SIMATIC PDM from the device. Communication is carried out via the HART protocol or PROFIBUS PA. For the HART protocol, the device can be accessed both via a HART modem and via a HART-compatible input/output module (remote IO). The corresponding device description files, such as GSD and (Enhanced) EDD are available for both types of communication.

In addition, the SITRANS DTM provides software based on tried and tested EDD technology that can be used to parameterize field devices via a DTM (Device Type Manager) using an FDT frame application (e. g. PACTware). SITRANS DTM and the necessary device-specific enhanced EDD are available for download free of charge. The software provides the relevant communication interfaces for HART and PROFIBUS.

#### Automatic commissioning

With a simple configuration menu the SIPART PS2 can be quickly adapted to the fitting and adjusted by means of an automatic startup function.

During initialization, the microcontroller determines the zero point, full-scale value, the direction of action and the positioning speed of the fitting. From this data it establishes the minimum pulse time and the deadband, thus optimizing the control.

#### Low air consumption

A hallmark of the SIPART PS2 is its own extremely low consumption of air. Normal air losses on conventional positioners are very costly. Thanks to the use of modern piezoelectric technology, the SIPART PS2 consumes air only when it is needed, which means that it pays for itself within a very short time.

#### **Positioners**

#### SIPART PS2

#### **Technical description**

#### Comprehensive monitoring functions

The SIPART PS2 has various monitoring functions with which changes on the actuator and valve can be detected and signaled if applicable when a selectable limit has been exceeded. This information may be important for diagnosis of the actuator or valve. The measuring data to be determined and monitored, some of whose limits can be adjusted, include:

- · Travel integral
- · Number of changes in direction
- Alarm counter
- · Self-adjusting deadband
- Valve end limit position (e. g. for detection of valve seat wear or deposits)
- Operating hours (also according to temperature and travel ranges) as well as min./max. temperature
- · Operating cycles of piezoelectric valves
- Valve positioning time
- · Actuator leakages

#### At a glance with the Diagnostics Cockpit

With the Diagnostics Cockpit, the HART variants of the SIPART PS2 provide a straightforward way of getting started with the world of diagnostic capabilities. All relevant information (setpoint, actual value, control deviation, status of the diagnostic system, etc.) of the valve is available at a glance. Additional facts and details are just a few mouse clicks away from the Diagnostics Cockpit.

#### Status monitoring with 3-stage alarm concept

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status indications derived from these monitoring functions signal active faults of the unit. The severity of these faults are graded using "traffic light signaling", symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Need for maintenance (green wrench)
- Urgent need for maintenance (yellow wrench)
- Imminent danger of unit failure or general failure (red wrench)

This allows users to put early measures into action before a serious valve or actuator fault occurs which could result in a system shutdown. The fact that a fault indication is signaled, such as the onset of a diaphragm break in the actuator or the progressive sluggishness of a unit, enables the user to ensure system reliability at any time by means of suitable maintenance strategies.

This three-stage alarm hierarchy also allows early detection and signaling of other faults, such as the static friction of a packing box, the wearing of a valve plug/seating, or precipitations or incrustations on the fittings.

These fault indications can be output either line-conducted over the alarm outputs (see above) of the positioner (max. 3), or via communication over the HART or field bus interfaces. In this case, the HART, PROFIBUS and FF versions of SIPART PS2 permit a differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the fittings.

The device display also displays the graded maintenance requirements, complete with identification of the source of the fault.

#### Maintenance required for valve

The Full Stroke Test, Step Response Test, Multi Step Response Test and Valve Performance Test provide detailed information about the maintenance required of the valve. With the help of HART communication, you receive comprehensive test results and can identify the extent of the maintenance measures. In order to quantify the performance capability of valves, characteristic values such as step response times (T63, T86, user-selectable Txx), dead times, overshoot, hysteresis, errors of measurement, non-linearity, etc., are determined.

#### Functional safety acc. to SIL2

The positioner is suitable for use on valves that satisfy the special requirements in terms of functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511. The variants 6DR5.1.-0...-Z C20 are available for this.

These are single-acting positioners for mounting on pneumatic actuators with spring return.

The positioner vents the valve actuator on demand/in the event of a fault and puts the valve in the preset safety position.

This positioner meets the following requirement:

 Functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511 for safe venting.

#### SIPART PS 2 as "intelligent solenoid valve"

Open/Close valves, safety fittings in particular, are generally pneumatically controlled over a solenoid valve. If you use SIPART PS2 instead of this type of solenoid valve, the positioner performs two tasks in a single device (without extra wiring)

- Firstly, it switches the fitting off on demand by venting the actuator (functional safety acc. to SIL 2 (see above)
- Secondly, it can perform a Partial Stroke Test at regular intervals (1 365 days), which prevents the blocking of the fitting, e. g. due to corrosion or furring.

As in this case SIPART PS2 is constantly working in normal operation (e. g. 99 % position), it also acts as a permanent test function for the pneumatic output circuit, which is not usually possible when using a solenoid valve.

Solenoid valves on control valves can also not normally be tested during operation. They are therefore not necessary when using SIPART PS 2 with a 4-wire connection system as the venting is carried out on demand by SIPART PS2. This means that on control valves, both the control function and the shut-off function can be carried out by a single device.

**Technical description** 

#### Configuring

In configuring mode, the SIPART PS2 positioner can be configured to requirements and include the following settings:

- Input current range 0 to 20 mA or 4 to 20 mA
- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Splitrange operation; adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed
- Direction of action; rising or falling output pressure with rising setpoint
- Limits (start-of-scale and full-scale values) of positioning range
- Limits (alarms) of the final control element position; minimum and maximum values
- Automatic "tight closing" (with adjustable response threshold)
- The travel can be corrected in accordance with the valve characteristic curve.
- · Function of binary inputs
- Function of alarm output etc.

Configuration of the various SIPART PS2 versions is largely identical.

# **Positioners**

# SIPART PS2

# Technical specifications

# Technical specifications

SIPART PS2 (all versions)			
Rated conditions		Outlet air valve (deaerate actuator	
Ambient conditions	For indoor and outdoor use	for fail in place version)	4.2 Nm3/h (10.0 HCanm)
Ambient temperature	In hazardous areas, observe the	<ul><li>- 2 bar (29 psi)</li><li>- 4 bar (58 psi)</li></ul>	4.3 Nm <sup>3</sup> /h (19.0 USgpm) 7.3 Nm <sup>3</sup> /h (32.2 USgpm)
	maximum permitted ambient tem- perature according to the tempe-	- 6 bar (87 psi)	9.8 Nm <sup>3</sup> /h (43.3 USgpm)
	rature class. See "Technical	Device leakage Y1/Y2 with	
Permitted ambient temperature for	Specifications" on page 5/9.	PZ = 4 bar (58 psi) and $T_{amb}$ = 20 °C (68 °F)	
operation <sup>2)3)</sup>	-30 +60 C (-22 +176 F)	• Standard	20 ml/min
• Altitude	2 000 m above sea level. At alti-	• Fail in Place	10 ml/min
	tudes greater than 2 000 m above sea level, use a suitable power	Restrictor ratio	Adjustable up to ∞ : 1
	supply.	Auxiliary power consumption in the	,
Relative humidity	0 100 %	controlled state	,
Degree of protection <sup>1)</sup>	IP66 according to IEC/EN 60529/NEMA 4X	Sound pressure	L <sub>Aeq</sub> < 75 dB L <sub>Amax</sub> < 80 dB
Mounting position	Any; pneumatic connections and exhaust opening not facing up in	Design	
	wet environment	Mode of operation	
Vibration resistance		<ul> <li>Range of stroke (linear actuators)</li> </ul>	3 130 mm (0.12 5.12 inch) (angle of positioner shaft
<ul> <li>Harmonic oscillations (sine-wave) according to</li> </ul>	3.5 mm (0.14"), 2 27 Hz, 3 cycles/axis		16 90°)
EN 60068-2-6/10.2008	98.1 m/s <sup>2</sup> (321.84 ft/s <sup>2</sup> ),		Larger range of stroke on request.
	27 300 Hz, 3 cycles/axis	Angle of rotation range	30 100°
<ul> <li>Bumping (half-sine) according to EN 60068-2-27/02.2010</li> </ul>	150 m/s² (492 ft/s²), 6 ms, 1000 shocks/axis	(part-turn actuators)	
Noise (digitally controlled) accord-	10 200 Hz; 1 (m/s²)²/Hz	Mounting type	
ing to EN 60068-2-64/04.2009	(3.28 (ft/s²)²/Hz) 200 500 Hz; 0.3 (m/s²)²/Hz	On linear actuators	Using mounting kit 6DR4004-8V and where necessary with an
	(0.98 (ft/s²)²/Hz)		additional lever arm 6DR4004-8L on actuators according to
• December and advertising of duty	4 hours/axis		IEC 60534-6-1 (NAMUR) with
<ul> <li>Recommended continuous duty range of the complete fitting</li> </ul>	≤ 30 m/s² (98.4 ft/s²) without resonance sharpness		ribs, bars or flat face.
Climatic class	According to EN 60721-3	<ul> <li>On part-turn actuators</li> </ul>	Using mounting kit 6DR4004-8D on actuators with mounting plane
• Storage	1K5, but -40 +80 °C (1K5, but -40 +176 °F)		according to VDI/VDE 3845 and IEC 60534-6-2.
• Transport	2K4, but -40 +80 °C (2K4, but -40 +176 °F)	Weight, positioner without option modules or accessories	
Pneumatic data		<ul> <li>6DR50 Glass-fiber reinforced en- closure made from polycarbonate</li> </ul>	Approx. 0.9 kg (1.98 lb)
Auxiliary power (air supply)	Compressed air, carbon dioxide (CO <sub>2</sub> ), nitrogen (N), noble gases	6DR51 Aluminum enclosure, narrow	Approx. 1.3 kg (2.86 lb)
• Pressure <sup>4)</sup>	or cleaned natural gas	• 6DR52 Stainless steel enclosure	Approx. 3.9 kg (8.6 lb)
Air quality to ISO 8573-1	1.4 7 bar (20.3 101.5 psi)	• 6DR53 Aluminum enclosure	Approx. 1.6 kg (3.53 lb)
Solid particulate size and density	Class 2	6DR55 Flameproof aluminum	Approx. 5.2 kg (11.46 lb)
Pressure dew point	Class 2 (min. 20 K (36 °F) below	enclosure	
Tressure dew point	ambient temperature)	Material	
Oil content	Class 2	• Enclosure	
Unrestricted flow (DIN 1945)		- 6DR50 Makrolon	Glass-fiber reinforced polycar- bonate (PC)
• Inlet air valve (ventilate actuator)5)		- 6DR51 Aluminum, narrow	GD AlSi12
- 2 bar (29 psi)	4.1 Nm <sup>3</sup> /h (18.1 USgpm)	- 6DR52 Stainless steel	Austenitic stainless steel 316Cb,
- 4 bar (58 psi)	7.1 Nm³/h (31.3 USgpm)	0005 0 44 1	mat. No. 1.4581
- 6 bar (87 psi)	9.8 Nm <sup>3</sup> /h (43.1 USgpm)	- 6DR53 Aluminum	GD AISi12
<ul> <li>Outlet air valve (deaerate actuator for all versions except fail in place)<sup>5)</sup></li> </ul>		<ul><li>6DR55 Aluminum, flameproof</li><li>Pressure gauge block</li></ul>	GK AlSi12 Aluminum AlMgSi, anodized
- 2 bar (29 psi)	8.2 Nm³/h (36.1 USgpm)	5 5 4	<u> </u>
- 4 bar (58 psi)	13.7 Nm <sup>3</sup> /h (60.3 USgpm)		
- 6 bar (87 psi)	19.2 Nm³/h (84.5 USgpm)		

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# **Positioners** SIPART PS2

## **Technical specifications**

			reominear opeomeations
Dimensions	See "Dimensional Drawings" on	Explosion protection	
Device versions	page 5/22	Explosion protection according to ATEX/IECEx	
• In Makrolon enclosure 6DR50	Single-acting and double-acting	Flameproof enclosure "d"	II 2 G Ex d IIC T6/T4 Gb
• In aluminum enclosure 6DR51	Single-acting	• Intrinsic safety "i"	II 2 G Ex ia IIC T6/T4 Gb
• Im aluminum enclosure 6DR53 and 6DR55	Single-acting and double-acting		II 3 G Ex ic IIC T6/T4 Gc II 2 D Ex ia IIIC T110°C Db
<ul> <li>In stainless steel enclosure 6DR52</li> </ul>	Single-acting and double-acting	Non-sparking "nA"	II 3 G Ex nA IIC T6/T4 Gc
Gauge		Dust, protection with "t" enclosure <sup>6)</sup>	II 2 D Ex tb IIIC T100°C Db
Degree of protection		Explosion protection according to FM/CSA, suitable for installations	
- Gauge made of plastic	IP31	according to NEC 500/NEC 505	
- Gauge made of steel	IP44	<ul><li>Flameproof enclosure "XP"</li></ul>	XP, Class I, Division 1, GP. ABCD XP, Class I, Zone 1, AEx d, IIC,
- Gauge made of stainless steel 316	IP54		T6/T4
Vibration resistance	According to EN 837-1	<ul><li>Intrinsic safety "IS"</li></ul>	IS / I, II, III / 1 / A-G IS / 1 / AEx / Ex ib / IIC, Gb
Connections, electrical	Ü		IS / 21 / AEx / Ex ib / IIIC, Db, T110°C
Screw terminals	2.5 mm <sup>2</sup> AWG30-14	Non-sparking "NI"	NI/I/2/A-D
Cable gland		- Non Spanning 1VI	NI / 2 / AEx / Ex nA, Ex ic / IIC, Gc
<ul> <li>Without explosion protection as well as with Ex i</li> </ul>	M20x1.5 or ½-14 NPT	<ul> <li>Dust, protection with "DIP" enclosure<sup>6)</sup></li> </ul>	DIP / II, III / 1 / E-G DIP / 21 / AEx / Ex tb / IIIC, Db, T100°C
- With explosion protection Ex d	Ex d certified M20x1.5; ½-14 NPT or M25x1.5	Natural gas as driving medium	For technical specifications using
Connections, pneumatic	Female thread G¼ or 14-18 NPT	Natural gas as unving medium	natural gas as driving medium, see operating instructions.
Controller		1) Max. impact energy 1 Joule for enclosure with inspection window 6DR50 and 6DR51 or max. 2 Joule for 6DR53.	
Controller unit		2) At ≤ -10 °C (≤ 14 °F) the display refre	esh rate of the indicator is limited.
Five-point switch	Self-adjusting	When using position feedback modu	ıle, only T4 is permitted.
Deadband		With Order suffix (Order code) -Z M4 device version with and without HAF	T: -40 +80 °C (-40 +176 °F).
- dEbA = Auto	Self-adjusting	4) The following applies to fail in place:	
- dEbA = 0.1 10 %	Can be set as fixed value	<ul> <li>With Ex d version (6DR55) values are reduced by approx. 20 %.</li> <li>For aluminum enclosure, narrow, single-acting, without inspection win</li> </ul>	
Analog-to-digital converter		6DR51DAZ	
• Scan time	10 ms	For stainless steel enclosure, 6DR5 For aluminum enclosure, with inspec	
<ul> <li>Resolution</li> </ul>	≤ 0,05 %		
<ul> <li>Transmission error</li> </ul>	≤ 0,2 %		
<ul> <li>Temperature influence effect</li> </ul>	≤ 0.1 %/10 K (≤ 0.1 %/18 °F)		
Certificates and approvals			
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1, complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)		

You can find the appropriate directives and standards, including the relevant versions, in the EC Declaration of Conformity on the Internet.

CE conformity

# **Positioners**

# SIPART PS2

## **Technical specifications**

#### SIPART PS2 with and without HART

	Basic device without Ex protection	Basic device with Ex d explosion protection	Basic device with "ia"explosion protection	Basic device with explosion protection "ic", "nA", "t"
Electrical specifications				
Current input I <sub>W</sub>				
Rated signal range		0/4	. 20 mA	
Test voltage			DC, 1 s	
Binary input BIN1 (terminals 9/10; electrically connected to the basic device)		Suitable only for floating	contact; max. contact load A at 3 V	
e-wire connection (terminals 6/8) DR50 and 6DR53 without HART DR51 and 6DR52 with HART				
Current to maintain the auxiliary power upply		≥ 3	.6 mA	
Required load voltage $U_B$ corresponds to $\Omega$ at 20mA) Without HART (6DR50)				
	6.26 \/ / .219.0\	6.26.\// 2.10.0\	7.9.1/( 200.0)	791// 200 01
- Typical	$6.36 \text{ V} (= 318 \Omega)$	$6.36 \text{ V} (= 318 \Omega)$	$7.8 \text{ V} (= 390 \Omega)$	$7.8 \text{ V} (= 390 \Omega)$
- max.	6.48 V (= 324 Ω)	6.48 V (= 324 Ω)	8.3 V (= 415 Ω)	8.3 V (= 415 Ω)
Without HART (6DR53)				
- Typical	$7.9 \text{ V} (= 395 \Omega)$	-	-	-
- max.	$8.4 \text{ V} (= 420 \Omega)$	-	-	-
With HART (6DR51)				
- Typical	6.6 V (= 330 Ω)	6.6 V (= 330 Ω)	-	-
- max.	$6.72 \text{ V} (= 336 \Omega)$	6.72 V (= 336 Ω)	-	-
With HART (6DR52)				
- Typical	-	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)
- max.	-	$8.8 \text{ V} (= 440 \Omega)$	8.8 V (= 440 Ω)	$8.8 \text{ V} (= 440 \Omega)$
Static destruction limit	±40 mA	±40 mA	-	-
ffective internal capacitance C <sub>i</sub>				
Without HART	-	-	11 nF	"ic": 11 nF
With HART	-	-	11 nF	"ic": 11 nF
ffective internal inductance Li				
Without HART	-	-	207 µH	"ic": 207 μH
With HART	-	_	310 µH	"ic": 310 µH
or connecting to circuits with the ollowing peak values	-	-	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$	"ic": U <sub>i</sub> = 30 V I <sub>i</sub> = 100 mA "nA"/"t":
-/4-wire connection terminals 2/4 and 6/8) DR52 with HART, xplosion-protected DR53 without HART,				U <sub>n</sub> ≤ 30 V I <sub>n</sub> ≤ 100 mA
ot explosion-protected)	≤ 0.2 V (= 10 Ω)	< 0.2 \/ (= 10.0)	≤ 1 V (= 50 Ω)	≤ 1 V (= 50 Ω)
oad voltage at 20 mA Yower supply U <sub>H</sub>	≤ 0.2 V (= 10 Ω) 18 35 V DC	$\leq 0.2 \text{ V} (= 10 \Omega)$	· · ·	` ′
	10 33 V DC	18 35 V DC	18 30 V DC )/2.4 kΩ [mA]	18 30 V DC
urrent consumption I <sub>H</sub>		(U <sub>H</sub> -7.5 V)		"io": 22 pF
ffective internal capacitance Ci	-	-	22 nF	"ic": 22 nF
ffective internal inductance L <sub>i</sub>	-	-	0.12 mH	"ic": 0,12 mH
or connecting to circuits with the fol- wing peak values			$U_i = 30 \text{ V DC}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$	"ic": $ U_i = 30 \text{ V} $ $ I_i = 100 \text{ mA} $ $"nA/"t": $ $ U_n \leq 30 \text{ V} $ $ I_n \leq 100 \text{ mA} $
Electrical isolation	between $U_H$ and $I_W$	between $U_H$ and $I_W$	between U <sub>H</sub> and I <sub>W</sub> (2 intrinsically safe circuits)	between U <sub>H</sub> and I <sub>W</sub>
ART communication				
IART communication			7	

# Technical specifications

#### SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus

	Basic device without Ex protection	Basic device with Ex d explosion protection	Basic device with "ia"explosion protection	Basic device with explosion protection "ic", "nA", "t"
Electrical specifications				
Power supply, bus circuit		Bus-s	supplied	
Bus voltage	9 32 V	9 32 V	9 24 V	9 32 V
For connecting to circuits with the following peak values				
Bus connection with FISCO supply unit			$U_i = 17.5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5.32 \text{ W}$	"ic": $  U_i = 17.5 \text{ V} \\ I_i = 570 \text{ mA} \\ "nA"/"t": U_n \leq 32 \text{ V} $
Bus connection with barrier			$U_i = 24 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1.2 \text{ W}$	"ic": $U_i = 32 \text{ V}$ "nA"/"t": $U_n \le 32 \text{ V}$
Effective internal capacitance	-	-	C <sub>i</sub> = negligible	C <sub>i</sub> = negligible
Effective internal inductance	-	-	$L_i = 8 \mu H$	"ic": L <sub>i</sub> = 8 μH
Current consumption		11.5 m	A ± 10 %	
Additional error signal		0	mA	
Safety shutdown can be activated with "jumper" (terminals 81/82)		electrically isolated from	bus circuit and binary input	
• Input resistance		> 2	20 kΩ	
• Signal state "0" (shutdown active)		0 4.5 V or	unconnected	
• Signal state "1" (shutdown not active)		13 .	30 V	
For connecting to power supply with the following peak values			$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$	"nA": U <sub>n</sub> ≤ 30 V I <sub>n</sub> ≤ 100 mA "ic":
				$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$
Effective Internal capacitance and inductance	-	-	negligibly small	negligibly small
Binary input BE1 for PROFIBUS (terminals 9/10); electrically connected to the bus circuit)	Suita	Bridged or connection able only for floating contact	on to switching contact. t; max. contact load < 5 μΑ	at 3 V
Electrical isolation				
<ul> <li>For basic device without Ex protection and for basic device with Ex d</li> </ul>	Electrical isolation between		nput for safety shutdown, as modules	s well as the outputs of the
• For basic device Ex "ia"	The basic device and		down, as well as the output nsically safe circuits.	s of the option modules,
• For basic device Ex "ic", "nA", "t"	Electrical		vice and the input for safety s of the option modules	y shutdown,
Test voltage		840 V	DC, 1 s	
PROFIBUS PA communication				
Communication	slave El	function; layer 7 (protocol N 50170 standard with the	ansmission technology acc layer) according to PROFIB extended PROFIBUS functi ole, feedbacks and status a	SUS DP, ons
C2 connections		nic	ation	60 s after break in commu-
Device profile	P	ROFIBUS PA profile B, vers	sion 3.0, more than 150 obje	ects
Response time to master message		Typica	lly 10 ms	
Device address		126 (whe	n delivered)	
PC parameterization software	SIMATIC PDM; supp	oorts all device objects. The	e software is not included in	the scope of delivery.

	Basic device without Ex protection	Basic device with Ex d explosion protection	Basic device with "ia"explosion protection	Basic device with explo- sion protection "ic", "nA", "t"
FOUNDATION Fieldbus communication				
Communications group and class	According to to	echnical specification of the	e Fieldbus Foundation for F	H1 communication
Function blocks	Group 3, Class 31PS (Publisher Subscriber) 1 Resource Block (RB2) 1 Analog Output Function Block (AO) 1 PID Function Block (PID) 1 Transducer Block (Standard Advanced Positioner Valve)			alve)
Execution times of the blocks	AO: 60 ms PID: 80 ms			
Physical layer profile	123, 511			
FF registration	Tested with ITK 5.0			
Device address		22 (whe	n delivered)	

# Technical specifications

#### Option modules

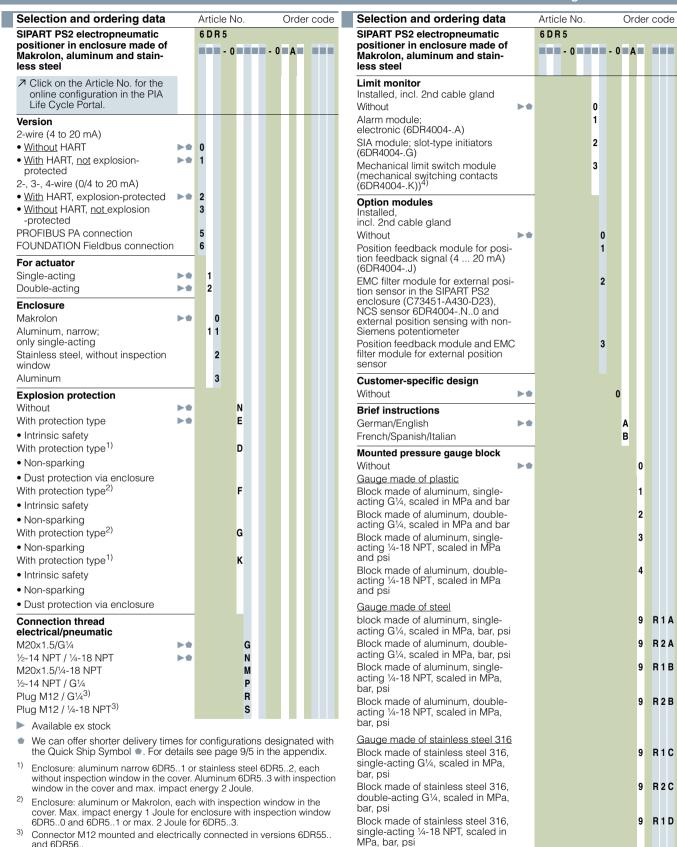
	Without Ex protection/ with Ex protection Ex d	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
Alarm module	6DR4004-8A	6DR4004-6A	6DR4004-6A
3 binary output circuits		Alarm output A1: Terminals 41 and	1 42
		Alarm output A2: Terminals 51 and     Alarma output Terminals 64 and 66	
B	.05.1/	Alarm output: Terminals 31 and 32	
Power supply U <sub>H</sub>	≤ 35 V	-	-
Signal state			
- High (not activated)	Conductive, R = 1 k $\Omega$ , +3/-1 % *)	≥ 2.1 mA	≥ 2.1 mA
- Low *) (activated)	Blocked, I <sub>R</sub> < 60 μA	≤ 1.2 mA	≤ 1.2 mA
Low is also the status when the pasic device is faulty or is without additional electrical power supply.	*) When used in the flameproof enclo- sure the current consumption must be limited to 10 mA per output.	Switching threshold with supply to EN 60947-5-6: $U_H = 8.2 \text{ V}, R_i = 1 \text{ k}\Omega$	Switching threshold with supply EN 60947-5-6: $U_H = 8.2 \text{ V}, R_i = 1 \text{ k}\Omega$
For connecting to circuits with the	-	$U_i = 15 \text{ V}$	"ic":
following peak values		$I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	$U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$
		1   - 04 11111	"nA"/"t": $U_n \le 15 \text{ V}$
		$C_i = 5.2  \text{nF}$	
Effective internal capacitance	-	'	$C_i = 5.2 \text{ nF}$
Effective internal inductance	-	L <sub>i</sub> = negligibly small	L <sub>i</sub> = negligibly small
binary output circuit	Binary input BE	2: Terminals 11 and 12, terminals 21	and 22 (bridge)
• Electrically connected to the basic device			
- Signal state 0		Floating contact, open	
- Signal state 1		Floating contact, closed	
- Contact load		3 V, 5 μA	
Electrically isolated from the basic		3 ν, 3 μΑ	
device			
- Signal state 0		≤ 4.5 V or open	
- Signal state 1		≥ 13 V	
- Natural resistance		≥ 25 kΩ	
Static destruction limit	± 35 V	-	-
For connecting to circuits with the following peak values		U <sub>i</sub> = 25.2 V	"ic": U <sub>i</sub> = 25.2 V "nA"/"t": U <sub>n</sub> ≤ 25.5 V
Effective internal capacitance	-	C <sub>i</sub> = negligibly small	C <sub>i</sub> = negligibly small
Effective internal inductance	_	L <sub>i</sub> = negligibly small	L <sub>i</sub> = negligibly small
Electrical isolation	The 3 outputs, the input B	E2 and the basic device are electrica	
est voltage	The o outputs, the input b	840 V DC, 1 s	iny isolated from each other
Position feedback module	6DR4004-8J	6DR4004-6J	6DR4004-6J
DC output for position feedback	0DN4004-0J	0DN4004-03	0DN4004-03
current output: Terminals 61 and 62		2-wire connection	
Rated signal range		4 20 mA, short-circuit proof	
otal operating range		3.6 20.5 mA	
Power supply U <sub>H</sub>	+12 +35 V	+12 +30 V	+12 +30 V
External loads R <sub>B</sub> [kΩ]		$\leq$ (U <sub>H</sub> [V] - 12 V)/I [mA]	
ransmission error		≤ 0,3 %	
emperature influence effect		≤ 0.1 %/10 K (≤ 0.1 %/18 °F)	
Resolution		≤ 0,1 %	
Residual ripple		≤ 1 %	
For connecting to circuits with the	-	$U_i = 30 \text{ V}$	"ic":
following peak values		$I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$	$U_i = 30 \text{ V},$ $I_i = 100 \text{ mA}$
			"nA"/"t":
			$U_n \le 30 \text{ V}, I_n \le 100 \text{ mA}$ $P_n \le 1 \text{ W}$
Effective internal capacitance	-	C <sub>i</sub> = 11 nF	$C_i = 11 \text{ nF}$
Effective internal inductance	-	L <sub>i</sub> = negligibly small	L <sub>i</sub> = negligibly small
Electrical isolation	Electrically isolated fro	m the alarm option and safely isolate	
est voltage	Liouthodily isolated in	840 V DC, 1 s	a trio basic device
100t voltago		0-10 V DO, 1 S	

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
SIA module	6DR4004-8G	6DR4004-6G	6DR4004-6G
Limit transmitter with slot-type initiators and alarm output			
2 slot-type initiators	• Binary of	output (limit transmitter) A1: Terminals	s 41 and 42
	Binary of	output (limit transmitter) A2: Terminals	s 51 and 52
<ul> <li>Connection</li> </ul>	2-wire system to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side		
<ul> <li>Signal state High (not activated)</li> </ul>		> 2.1 mA	
<ul> <li>Signal state Low (activated)</li> </ul>		< 1.2 mA	
• 2 slot-type initiators		Type SJ2-SN	
• Function		NC (normally closed)	
Connecting to circuits with the following peak values	Rated voltage 8 V current consumption: ≥ 3 mA (limit value not responded), ≤ 1 mA (limit value responded)	$U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	"ic": $ U_i = 15 \text{ V} $ $ I_i = 25 \text{ mA} $ "nA": $ U_n \le 15 \text{ V} $ $ P_n \le 64 \text{ mW} $
Effective internal capacitance	_	$C_i = 41 \text{ nF}$	C <sub>i</sub> = 41 nF
Effective internal inductance	-	$L_i = 100 \mu H$	L <sub>i</sub> = 100 μH
1 alarm output		Binary output: Terminals 31 and 32	
<ul> <li>Connection</li> </ul>	On switching amplifier	according to EN 60947-5-6: (NAMUR	$P_{i}$ ), $U_{H} = 8.2 \text{ V}$ , $R_{i} = 1 \text{ k}\Omega$ ).
<ul> <li>Signal state High (not activated)</li> </ul>	$R = 1.1 \text{ k}\Omega$	> 2.1 mA	> 2.1 mA
<ul> <li>Signal state Low (activated)</li> </ul>	$R = 10 \text{ k}\Omega$	< 1.2 mA	< 1.2 mA
• Power supply U <sub>H</sub>	$U_H \le 35 \text{ V DC}$ I $\le 20 \text{ mA}$	-	-
Connecting to circuits with the following peak values	-	$U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	"ic": $ U_i = 15 \text{ V} $ $ I_i = 25 \text{ mA} $ "nA": $ U_n \leq 15 \text{ V} $ $ P_n \leq 64 \text{ mW} $
Effective internal capacitance	-	$C_i = 5.2 \text{ nF}$	C <sub>i</sub> = 5.2 nF
Effective internal inductance	-	L <sub>i</sub> = negligibly small	L <sub>i</sub> = negligibly small
Electrical isolation	The 3 outp	uts are electrically isolated from the b	pasic device.
Test voltage		840 V DC, 1 s	

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "t"
Mechanical limit switch module	6DR4004-8K	6DR4004-6K	6DR4004-6K
Limit transmitter with mechanical switching contacts			
2 limit value contacts		<ul> <li>Binary output A1: Terminals 41 and</li> <li>Binary output A2: Terminals 51 and</li> </ul>	
Max. switching current AC/DC	4 A	-	-
Connecting to circuits with the following peak values	-	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 750 \text{ mW}$	"ic": $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ "t": $U_n = 30 \text{ V}$ $I_n = 100 \text{ mA}$
Effective internal capacitance	_	C <sub>i</sub> = negligibly small	$C_i = \text{negligibly small}$
Effective internal inductance	_	$L_i$ = negligibly small	L <sub>i</sub> = negligibly small
Max. switching voltage AC/DC	250 V/24 V	30 V DC	30 V DC
Max. ownorming ventage 7.0720	200 1/2 1 1	00 1 20	00 1 20
1 alarm output		Binary output: Terminals 31 and 32	
• Connection		ling to EN 60947-5-6: (NAMUR), $I_i = 1 \text{ k}\Omega$ ).	-
<ul> <li>Signal state High (not activated)</li> </ul>	$R = 1.1 \text{ k}\Omega$	> 2.1 mA	> 2.1 mA
<ul> <li>Signal state Low (activated)</li> </ul>	$R = 10 \text{ k}\Omega$	< 1.2 mA	< 1.2 mA
Auxiliary power	$U_H \le 35 \text{ V DC}$ I $\le 20 \text{ mA}$	-	-
Connecting to circuits with the following peak values	-	U <sub>i</sub> = 15 V I <sub>i</sub> = 25 mA P <sub>i</sub> = 64 mW	"ic": $ U_i = 15 \text{ V} $ $ I_i = 25 \text{ mA} $ "t": $ U_n = 15 \text{ V} $ $ I_n = 25 \text{ mA} $
Effective internal capacitance	_	$C_i = 5.2 \text{ nF}$	$C_i = 5.2  \text{nF}$
Effective internal inductance	_	$L_i = \text{negligibly small}$	$L_i = \text{negligibly small}$
Electrical isolation	The 3 outr	outs are electrically isolated from the b	
Test voltage	0 044	3 150 V DC, 2 s	
Rated conditions altitude	Max. 2 000 m NN At altitudes over 2 000 m NN, use a suitable power supply	-	
	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
EMC filter module	EMC filter module type C73451-A4 position sensor (pote	430-D23 is required for NCS sensor or entiometer or NCS; as option) with the	r an external potentiometer. External following peak values
Resistance of external potentiometer		10 kΩ	
Peak values when suppled via the PROFIBUS basic device	•	$U_0 = 5 \text{ V}$ $I_0 = 75 \text{ mA statisch}$ $I_0 = 160 \text{ mA kurzfristig}$ $P_0 = 120 \text{ mW}$	$U_0 = 5 \text{ V}$ $I_0 = 75 \text{ mA}$ $P_0 = 120 \text{ mW}$
Peak values when suppled via other basic devices	-	$U_{o} = 5 \text{ V}$ $I_{o} = 100 \text{ mA}$ $P_{o} = 33 \text{ mW}$ $C_{o} = 1  \mu\text{F}$ $L_{o} = 1 \text{ mH}$	$U_{o} = 5 \text{ V}$ $I_{o} = 75 \text{ mA}$ $P_{o} = 120 \text{ mW}$ $C_{o} = 1 \mu\text{F}$ $L_{o} = 1 \text{ mH}$
Electrical isolation	E	lectrically connected to the basic dev	

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA"
NCS sensor			
Position range			
• Linear actuator 6DR4004N.20		3 14 mm (0.12 0.55")	
• Linear actuator 6DR4004N.30	10 130 m	nm (0.39 5.12"); up to 200 mm (7.87	7") on request
Part-turn actuator		30° 100°	
Linearity (after correction by positioner)			
Linear actuator		± 1 %	
Part-turn actuator		± 1 %	
Hysteresis		± 0,2 %	
Temperature influence (range: rotation angle 120° or stroke 14 mm)		K (≤ 0.1 %/18 °F) for -20 +90 °C (- 0 K (≤ 0.2 %/18 °F) for -4020 °C (-	
Climatic class		According to EN 60721-3	
• Storage	1K5,	but -40 +90 °C (1K5, but -40 +1	94 °F)
Transport	2K4,	but -40 +90 °C (2K4, but -40 +1	94 °F)
Vibration resistance			
Harmonic oscillations (sine) ac- cording to IEC 60068-2-6		3.5 mm (0.14"), 2 27 Hz; 3 cycles/a n/s² (321.84 ft/s²), 27 300 Hz, 3 cyc	
<ul> <li>Bumping according to IEC 60068-2-29</li> </ul>	300	$0 \text{ m/s}^2 (984 \text{ ft/s}^2), 6 \text{ ms}, 4 000 \text{ shocks}$	/axis
Degree of protection of enclosure	IP68 acco	rding ot IEC EN 60529; NEMA 4X / Er	ncl. Type 4X
Connecting to circuits with the following peak values	-	$U_i = 5 \text{ V}$ $I_i = 160 \text{ mA}$ $P_i = 120 \text{ mW}$	U <sub>i</sub> = 5 V
Effective internal capacitance	_	$C_i = 180 \text{ nF}$	$C_i = 180 \text{ nF}$
Effective internal inductance	-	L <sub>i</sub> = 922 μH	L <sub>i</sub> = 922 μH
Explosion protection according to ATEX/IECEx	-	Intrinsic safety "ia": II 2 G Ex ia IIC T6/T4 Gb	Intrinsic safety "ic": II 3 G Ex ic IIC T6/T4 Gc Non-sparking "nA": II 3 G Ex nA IIC T6/T4 Gc
Explosion protection according to FM	-	Intrinsic safety "ia": IS, Class I, Divison 1, ABCD IS, Class I, Zone 1, AEx ib, IIC	Non-sparking, "nA": NI, Class I, Divison 2, ABCD NI, Class I, Zone 2, AEx nA, IIC
Permissible ambient temperature			
• ATEX/IECEx	-		C (-40 +194 °F) C (-40 +158 °F)
• FM	-	T4: -40 +85 °	C (-40 +136 °F) C (-40 +185 °F) C (-40 +158 °F)

#### Selection and Ordering data SIPART PS2



Connector M12 mounted in versions 6DR50.., 6DR51.., 6DR52.. and

Not for protection type "dust protection by enclosure" 6DR5...-0D... and

Siemens FI 01 · June 2015

Block made of stainless steel 316,

double-acting 1/4-18 NPT, scaled in

4) Not for protection type "non-sparking"

MPa, bar, psi

R 2 D

# **Positioners**

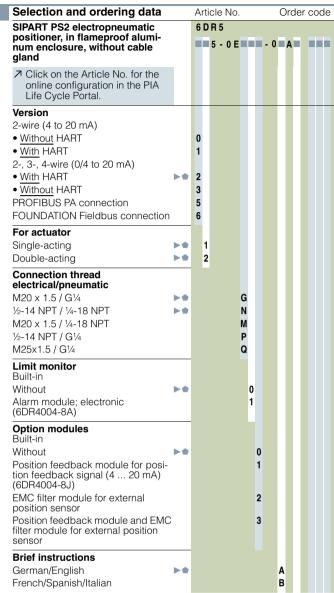
# SIPART PS2

# Selection and Ordering data SIPART PS2

Selection and ordering data	Article No. Order code
SIPART PS2 electropneumatic	6 D R 5
positioner in enclosure made of Makrolon, aluminum and stain-	- 0 - A - A - A - A - A - A - A - A - A
less steel	
Further designs	Order code
Add "-Z" to Article No. and specify Order Code.	
TAG plate made of stainless steel, 3-line	A20
Text line 1: Plain text from Y17 Text line 2: Plain text from Y15	
Text line 3: Plain text from Y16	
Version with stainless steel sound absorbers	A40
Standard with stainless steel enclosure	
Functional safety (SIL 2) only for 6DR5.1. (single-acting positio-	C20
ners) Device suitable for use according to IEC 61508 and IEC 61511	
Fail in Place	F01
Holding function in case of auxiliary electrical power failure	
Pneumatic terminal block made of stainless steel 316	K18
OPOS adapter with interface VDI/VDE 3847	K20
blanketing, not for flameproof alumi- num enclosure	
Marine approval	
Germanischer Lloyd certificate	S10
LR Lloyds Register certificate	S11
BV Bureau Veritas certificate	S12
ABS American Bureau of Shipping certificate	S13
DNV-GL Det Norske Veritas	S14
Measuring point description Max. 16 characters for HART,	Y15
max. 32 characters for PROFÍBUS	
PA, FOUNDATION Fieldbus and 4 20 mA,	
specify in plain text: Y15:	
Measuring point text Max. 24 characters for HART.	Y16
max. 32 characters for PROFIBUS	
PA, FOUNDATION Fieldbus and 4 20 mA,	
specify in plain text: Y16:	
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: Y17:	Y17
Preset bus address	Y25
Specify in plain text: <b>Y25:</b> (only for 6DR55 and 6DR56)	
Customer-specific parameter set-	Y30
Specify in plain text: <b>Y30:</b>	

<sup>►</sup> Available ex stock

#### **Selection and Ordering data SIPART PS2**



- Available ex stock
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and C	racing data		1 32
Selection and ordering data	Article No.	Order	code
SIPART PS2 electropneumatic positioner, in flameproof alumi- num enclosure, without cable gland	6 D R 5	· 0 = A =	П
Mounted pressure gauge block Without		0	
Gauge made of plastic, block made of aluminum, single-acting G <sup>1</sup> / <sub>4</sub> , scaled in MPa and bar		1	
Gauge made of plastic, block made of aluminum, double-acting G <sup>1</sup> / <sub>4</sub> , scaled in MPa and bar		2	
Gauge made of plastic, block made of aluminum, single-acting 14-18 NPT, scaled in MPa and psi		3	
Gauge made of plastic, block made of aluminum, double-acting 1/4-18 NPT, scaled in MPa and psi		4	
Gauge made of steel  Block made of aluminum, single- acting G¼, scaled in MPa, bar, psi		9	R 1 A
Block made of aluminum, double-		9	R 2 A
acting G <sup>1</sup> / <sub>4</sub> , scaled in MPa, bar, psi Block made of aluminum, single-		9	R1B
acting 1/4-18 NPT, scaled in MPa, bar, psi			
Block made of aluminum, double-acting 14-18 NPT, scaled in MPa, bar, psi Gauge made of stainless steel 316		9	R 2 B
Block made of stainless steel 316, sin-		9	R1C
gle-acting G¼, scaled in MPa, bar, psi Block made of stainless steel 316, dou-		9	R 2 C
ble-acting G1/4, scaled in MPa, bar, psi		3	n Z C
Block made of stainless steel 316, single-acting ½-18 NPT, scaled in MPa, bar, psi		9	R 1 D
Block made of stainless steel 316, double-acting ½-18 NPT, scaled in MPa, bar, psi		9	R 2 D
Further designs Add "-Z" to Article No. and specify Order Code.	Order code		
TAG plate made of stainless steel,	A20		
3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16			
Functional safety (SIL 2) only for	C20		
6DR5.1. (single-action positio- ners)			
Device suitable for use according to IEC 61508 and IEC 61511			
Fail in Place Holding function in case of auxiliary electrical power failure	F01		
Pneumatic terminal block made of stainless steel 316	K18		
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS	Y15		
PA and FOUNDATION Fieldbus, specify in plain text: <b>Y15:</b>			
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y16:	Y16		
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: Y17:	Y17		
Preset bus address Specify in plain text: Y25: only for 6DR55 and 6DR56)	Y25		
> A 11 1 1 1 1			

#### Selection and Ordering data Accessories/Spare parts

Selection and ordering data		Article No.
Accessories		
<b>Position feedback module</b> for position feedback signal (4 20 mA)		
<ul> <li>Without explosion protection</li> </ul>	•	6DR4004-8J
With ATEX/IECEx and FM/CSA explosion protection	<b>&gt;</b>	6DR4004-6J
<b>Alarm module</b> for 3 alarm outputs and 1 binary input (functionality: 2 limit monitors, 1 fault alarm, 1 binary input)		
Without explosion protection	•	6DR4004-8A
With ATEX/IECEx and FM/CSA explosion protection	<b>&gt;</b>	6DR4004-6A
<b>SIA module</b> (slot-type initiator alarm module, not for Ex d version)		
<ul> <li>Without explosion protection</li> </ul>	•	6DR4004-8G
With ATEX/IECEx and FM/CSA explosion protection	<b>&gt;</b>	6DR4004-6G
<b>Mechanical limit switch module</b> (with mechanical ground contacts, not for Ex d version)		
Without explosion protection	•	6DR4004-8K
With explosion protection	<b>&gt;</b>	6DR4004-6K
<b>EMC filter module</b> with and without explosion protection for connection of external position sensor (10 k $\Omega$ ) or NCS sensor	•	C73451-A430-D23
► Available ex stock		

Selection and ordering data	Article No.	
Accessories		
NCS sensor for non-contacting detection of position (not for Ex d version)	6 D R 4 0 0 4 - ■ N	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Explosion protection		
Not explosion-proof With protection type (ATEX/IECEx/FM) Intrinsic safety Non-sparking	8 6	
Cable length		
6 m (19.68 ft)	N	
20 m (65.67 ft) 40 m (131.23 ft)	R	
Actuator type	_	
For part-turn actuators, glass fiber-rein- forced polyester magnet holders <sup>1)</sup>		1
For linear actuators		2
up to 14 mm (0.55 inch) <sup>2)</sup> For linear actuators		3
> 14 130 mm (0.55 5.12 inch) <sup>3)</sup> For part-turn actuators, anodized aluminum magnet holders		4

- 1) Fitted with mounting console, available for order separately as accessory.
  2) Mounted with individual mounting solution. Only a NAMUR mounting bracket can be used as mounting base (order separately as accessory).
  3) Mounted with NAMUR interface. Article No. either 6DR4004-8V or 6DR4004-8V + 6DR4004-8L depending on stroke range.

  Or mounted without NAMUR interface, individual mounting solution. Article No. 6DR4004-8VK or 6DR4004-8VL can be used as individual mounting solution depending on the stroke range.

Selection and ordering data		Article No.
External position detection system (with explosion protection to ATEX/IECEx) for separate mounting of position sensor and controller unit (not for Ex d version), comprising SIPART PS2 Makrolon enclosure with integral potentiometer and sliding clutch (without electronics and valve block)  The EMC filter module is additionally required for	•	C73451-A430-D78
the controller unit. (separate ordering item, see above).		
Gauge block with		
2 gauges made of plastic, block made of aluminum, single-acting G½, scaled in MPa and bar	•	6DR4004-1M
3 gauges made of plastic, block made of aluminum, double-acting G1/4, scaled in MPa and bar	•	6DR4004-2M
2 gauges made of plastic, block made of aluminum, single-acting 1/4-18 NPT, scaled in MPa and psi	•	6DR4004-1MN
3 gauges made of plastic, block made of aluminum, double-acting 1/4-18 NPT, scaled in MPa and psi	•	6DR4004-2MN
2 gauges made of steel Block made of aluminum, single-acting G1/4, scaled in MPa, bar, psi	•	6DR4004-1P
3 gauges made of steel Block made of aluminum, double-acting G1/4, scaled in Mpa, bar, psi	•	6DR4004-2P
2 gauges made of steel Block made of aluminum, single-acting ¼-18 NPT, scaled in MPa, bar, psi	•	6DR4004-1PN
3 gauges made of steel Block made of aluminum, double-acting ¼-18 NPT, scaled in MPa, bar, psi	•	6DR4004-2PN
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi	<b>&gt;</b>	6DR4004-1Q
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting G <sup>1</sup> / <sub>4</sub> , scaled in MPa, bar, psi	•	6DR4004-2Q
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting 1/4-18 NPT, scaled in MPa, bar, psi	•	6DR4004-1QN
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting 1/4-18 NPT, scaled in MP, bar, psi	•	6DR4004-2QN
Pneumatic terminal block made of stainless steel 316		
to replace the pneumatic terminal block made of aluminum		
Single-acting with G1/4	<b>&gt;</b>	6DR4004-1R
Double-acting with G1/4	<b></b>	6DR4004-2R
Single-acting with 1/4-18 NPT	<b></b>	6DR4004-1RN
Double-acting with 1/4-18 NPT	<b></b>	6DR4004-2RN
Mounting kit for NAMUR part-turn actuators		
(VDI/VDE 3845, with plastic coupling wheel, without mounting console)	•	6DR4004-8D
(VDI/VDE 3845, with stainless steel coupling, without mounting console)		TGX:16300-1556
The following mounting consoles can be used with the NAMUR part-turn actuator mounting kit 6DR4004-8D and TGX:16300-1556. Size W x L x H (H = height of shaft butt)		
• 30 x 80 x 20 mm	<b></b>	TGX:16152-105
• 30 x 80 x 30 mm	<b></b>	TGX:16300-147
• 30 x 130 x 30 mm	<b></b>	TGX:16300-149
• 30 x 130 x 50 mm	<b></b>	TGX:16300-151

# Selection and Ordering data Accessories/Spare parts

Mounting kit for other part-turn actuators	
The following mounting consoles can be used	
together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.	
SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 ▶ and R2A	TGX:16152-328
Masoneilan Camflex II	TGX:16152-350
• Fisher 1051/1052/1061, sizes 30, 40, 60 to 70	TGX:16152-364
• Fisher 1051/1052, size 33	TGX:16152-348
Mounting kit for NAMUR linear actuators	
NAMUR linear actuator mounting kit with short lever (2 35 mm (0.08 1.38 inch)	6DR4004-8V
<ul> <li>Long lever for travels from 35 130 mm (1.38 5.12 inch) without NAMUR mounting bracket</li> </ul>	6DR4004-8L
Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm travel (1.38 inch)	6DR4004-8VK
Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with long lever with > 35 mm travel (1.38 inch)	6DR4004-8VL
Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators	6DR4004-3N
<ul> <li>Two terminal blocks made of stainless steel 316 ▶ for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators</li> </ul>	6DR4004-3M
Mounting kit for other linear actuators	
<ul> <li>Retrofitting kit for Moore series 72 and 750 valve positioners</li> </ul>	TGX:16152-117
Masoneilan type 87/88	TGX:16152-620
• Fisher type 657/667, size 30 to 80	TGX:16152-110
• Samson actuator type 3277	6DR4004-8S
(yoke dimension (H5) = 101 mm <sup>2</sup> (integrated connection without tube), not for Ex d	
OPOS Interface according to VDI/VDE 3847	
OPOS adapter with interface VDI/VDE 3847, blanketing, not for flameproof aluminum enclo- sure	6DR4004-5PA
<ul> <li>OPOS/NAMUR mounting kit with short lever for installation according to NAMUR or integrated installation without pipe</li> </ul>	6DR4004-5PL
<b>Connection block</b> , for safety solenoid valve with extended mounting flange to NAMUR	
• For mounting to IEC 534-6	6DR4004-1B
• For SAMSON actuator (integrated mounting)	6DR4004-1C <sup>1)</sup>

see above

9	
Documentation (see notes below)	
Operating Instructions	
SIPART PS2 HART German	A5E00074630
• SIPART PS2 HART English	A5E00074631
• SIPART PS2 PROFIBUS PA German	A5E00127924
• SIPART PS2 PROFIBUS PA English	A5E00127926
• SIPART PS2 FOUNDATION Fieldbus German	A5E00214568
<ul> <li>SIPART PS2 FOUNDATION Fieldbus English</li> </ul>	A5E00214569
SIPART PS2 Compact Instruction Manual	
<ul> <li>English, French, German, Spanish, Italian, Dutch</li> </ul>	A5E03436620
• Estonian, Latvian, Lithuanian, Polish, Romanian	A5E03436655
• Bulgarian, Czech, Finnish, Slovakian, Slovenian	A5E03436664
<ul> <li>Danish, Greek, Portuguese, Swedish, Hungarian</li> </ul>	A5E03436683
Operating Instructions for NCS Sensor	
<ul> <li>English, German, French, Italian, Spanish, Portuguese (Brazil)</li> </ul>	A5E00097485
SIPART PS2 device documentation	
<ul> <li>DVD with complete documentation for all device versions</li> </ul>	A5E00214567
SITRANS I100 output isolator HART (see "SITRANS I supply units and isolation amplifiers") with	
• 24 V DC auxiliary power	7NG4124-0AA00
SITRANS I200 output isolator HART (see "SITRANS I supply units and isolation amplifiers") with	
• 24 V DC auxiliary power	7NG4131-0AA00
HART modem for connecting to PC or laptop	
• with USB interface	7MF4997-1DB

- ► Available ex stock
- 1) Only together with 6DR4004-8S

#### Note:

All the above-mentioned manuals are included on DVD and can be downloaded from www.siemens.de/sipartps2.

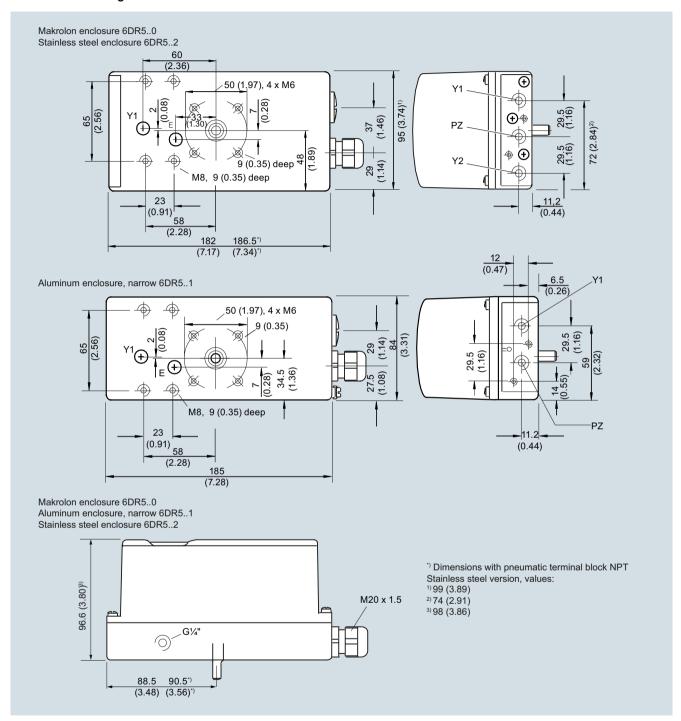
# Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 DVD with the complete documentation for all versions and accessories
- Short manual "SIPART PS2 Configuration At a Glance"

Selection and ordering data	Article No.
NCS-Sensor spare parts	
Magnet holder made of fiberglass-reinforced polyester including magnet for non-contacting position detection for part-turn actuators	A5E00078030
Magnet holder made of anodized aluminum including magnet for non-contacting position detection for part-turn actuators	A5E00524070

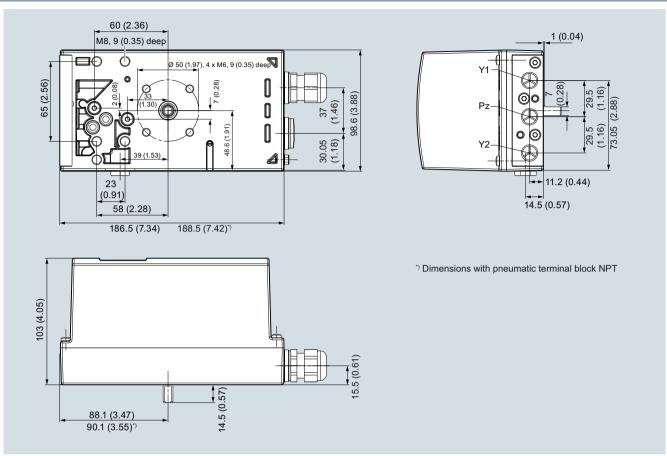
# Dimensional drawings

#### Dimensional drawings



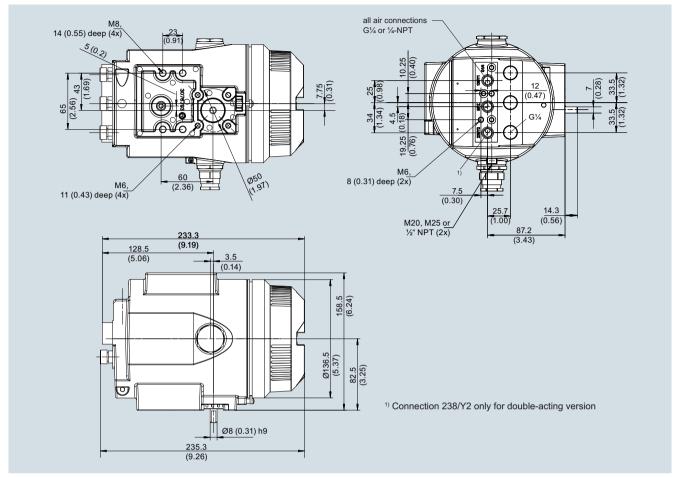
Enclosure, dimensions in mm (inch)

# Dimensional drawings

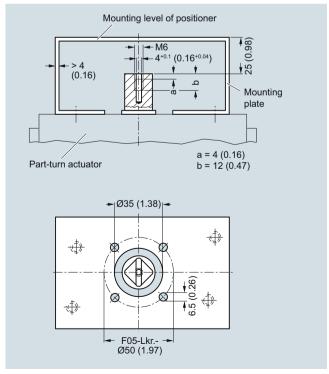


Aluminum enclosure 6DR5..3, dimensions in mm (inch)

#### **Dimensional drawings**



Flameproof aluminum enclosure 6DR5..5, dimensions in mm (inch)



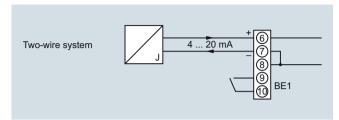
Mounting onto part-turn actuators; mounting consoles (scope of delivery of actuator manufacturer), extract from VDI/VDE 3845, dimensions in mm (inch)

**Schematics** 

# Schematics

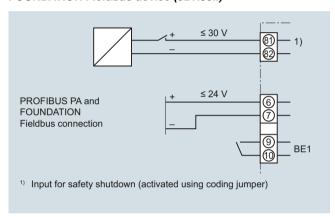
#### Electric connection of 2-wire devices (6DR50.. and 6DR51..)

Devices of types 6DR50.. and 6DR51.. are operated in a 2-wire system.



SIPART PS2 electropneumatic positioner, input circuit for 6DR50.. and 6DR51..

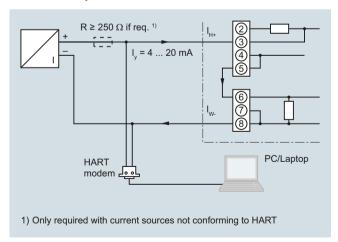
# Electric connection of PROFIBUS PA device (6DR55..) and FOUNDATION Fieldbus device (6DR56..)



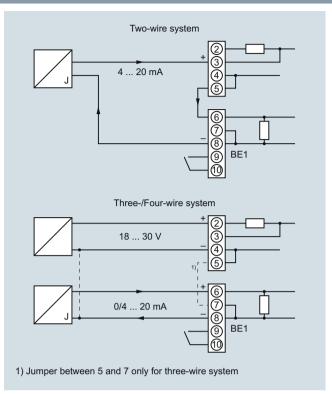
SIPART PS2 PA and SIPART PS2 FF electropneumatic positioner, input circuit for 6DR55.. and 6DR56..

# Electric connection of 2-, 3- and 4-wire device (6DR52.. and 6DR53..)

Devices of types 6DR52.. and 6DR53.. can be operated in a 2-, 3- and 4-wire system.



SIPART PS2 electropneumatic positioner, example of connection for communication through HART for 6DR52..

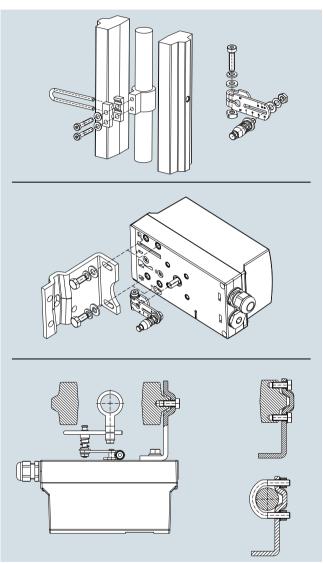


SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53..

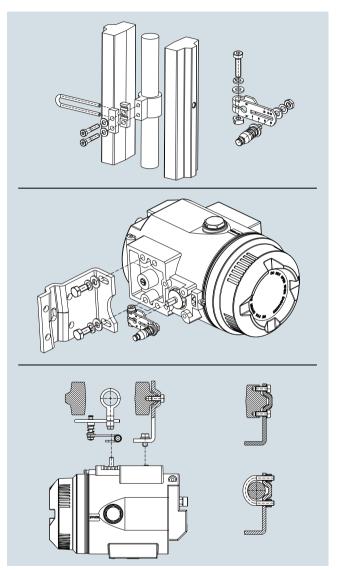
# Mounting kit

# Mounting kit for NAMUR linear actuators

- 1 mounting bracket
- 2 mounting prisms
- 1 U-bracket
- 1 lever arm with adjustable pick-up roll
- 2 U-bolts
- Various screws and lock washers



Mounting of SIPART PS2 on linear actuators



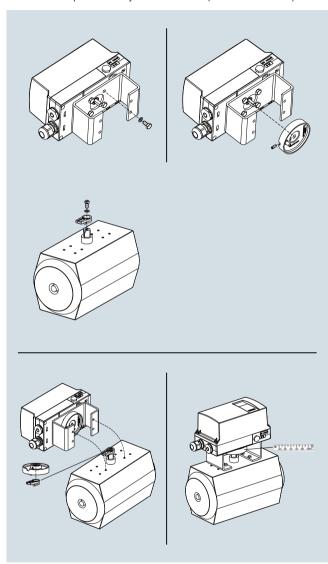
Mounting of SIPART PS2 in flameproof aluminum enclosure on linear actuators

Mounting kit

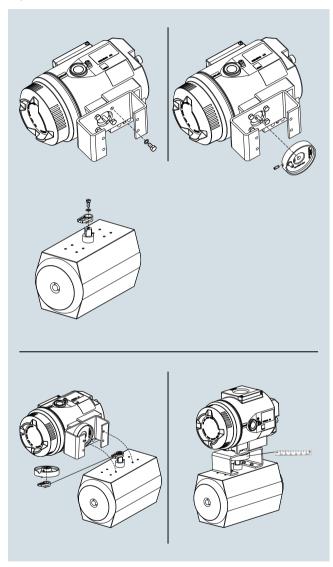
#### Mounting kit for NAMUR part-turn actuators

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

Caution: The mounting consoles and the screws for mounting onto the part-turn actuator are not included in the scope of delivery and must be provided by the customer (see "Technical specifications")



Mounting of SIPART PS2 on part-turn actuators



Mounting of SIPART PS2 in flameproof aluminum enclosure on part-turn actuators

More information

Special versions

On request

# **Positioners**

Notes



6/2	Overview
6/3	Acoustic and motion sensing
6/5	Acoustic sensors for pump monitoring SITRANS DA400 acoustic diagnostic unit
6/10 6/14	Acoustic sensors for material flow monitoring SITRANS AS100 acoustic sensor SITRANS CU02 control unit
6/17	Motion sensors Milltronics MFA 4p motion failure alarm controller

Milltronics MSP-7 motion sensor SITRANS WM100 motion sensor

You can download all instructions, catalogs and certificates for Process Protection free of charge at: www.siemens.com/processprotection

Overview

# Overview

	Application	Device description	Page
Acoustic sensor for pump monitoring			
	Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways.	SITRANS DA400  4 inputs for structure-born noise sensors  4 universal inputs  6 digital outputs  With PROFIBUS DP or PROFIBUS PA  Sensor degree of protection IP66/IP68	6/5
Acoustic sensors for material flow monitor	ng		
	Acoustic sensor for solids flow detection.	SITRANS AS100  Non-invasive  Screw in, bolt on, weld, or bond in place  Analog output  High and low sensitivity range of operation	6/10
STRANG CU CO	Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow.  It processes signals from the sensor, providing relay and analog outputs for interface into a process.	SITRANS CU02  • 3 digit LCD display  • 4 20 mA output  • Two programmable relays  • Adjustable independent time delay for each relay  • DIN rail mounting provides easy installation	6/14
Motion sensors			
SOLIMANS MARKET AND A SOLIMAN	Highly sensitive single set point motion sensor alarm unit, used with MSP probes.	Milltronics MFA 4p     Probe/target separation up to 100 mm (4 inch)     Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm)	6/17
	Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs.	Milltronics MSP-7  • Up to 100 mm (4 inch) gap between target and probe  • Corrosion resistant construction	6/23
	Heavy-duty zero speed alarm switch.	SITRANS WM100  Detects the absence or presence of motion of rotating or reciprocating or conveying equipment  Output  Description:	6/25

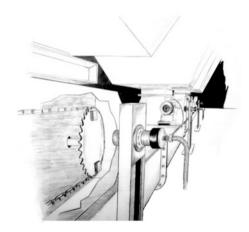
Acoustic and Motion sensing

#### Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.



Motion sensing on drive shaft of rotary feeder

#### Mode of operation

#### Acoustic Sensing

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The SITRANS AS100 sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

#### Motion sensing

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

Acoustic and Motion sensing

# Technical specifications

# **Process Protection Selection Guide**

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	Milltronics MSP-7	SITRANS WM100
Typical industries	Mining, water/wastewa- ter, chemicals/petro- chemicals and oil & gas industry	Aggregates, grain, cement, food processing, power generation, steel processing	Aggregates, cement, mining, wastewater, grain	General industrial applications	Aggregates, cement, mining
Typical Applications	Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hosetype diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels.	Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulley shafts, driven pulleys, motor shaft sens- ing, belt or drag convey- ors, screw conveyor flights, bucket elevators, fans and pumps	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators
Operation	Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency	Acoustic sensing	Motion sensing	Motion sensing	Motion sensing
Enclosure	Electronics housing, Makrolon IP65, sensor, stainless steel material number WNo. 1.4571 (316Ti SST)	Compact 304 or 303 stainless steel, IP68	Type 4X/NEMA 4X/IP65 polycarbonate	Type 4X/NEMA 4X/IP67 aluminum	Type 4X/NEMA 4X/IP67 aluminum
Sensor mounting	Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways	glue or weld-on disc, bolt	Non-contacting probes secured with supplied flange	Non-contacting probe secured with supplied flange	Non-contacting, secured with supplied flange
Operating temperature	Electronics: -20 °C +60 °C (-4 °F +140 °F) Sensor: -20 °C +110 °C (-4 °F +230 °F)	-20 +80 °C (-4 +176 °F) <sup>1)</sup>	-20 +50 °C (-4 +122 °F) <sup>2)</sup>	-40 +60 °C (-40 +140 °F)	-40 +60 °C (-40 +140 °F)
Power requirements	19 V 36 V DC, < 100 mA	20 30 V DC, 18 mA	100/115/200/230 V AC ± 10 % 50/60Hz, 15 VA	21 28 V DC, 40 mA max.	115 or 230 V AC ± 10 % 50/60 Hz, 7 VA
Approvals	CE, PROFIBUS DP and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D	CE, RCM, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II, 2GD, 3D optional, GOST-R	CSA <sub>US/C</sub> , CE, RCM	CE, RCM	CSA <sub>US/C</sub> , CE, RCM

 $<sup>^{1)}</sup>$  Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)

 $<sup>^{2)}</sup>$  Probes available for -40  $\dots$  +260 °C (-40  $\dots$  +500 °F)

Acoustic sensors for pump monitoring

#### SITRANS DA400 acoustic diagnostic unit

#### Overview



The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- In the version for pump monitoring; on oscillating displacement pumps
- In the version for material flow monitoring; on pipes, conveying Function equipment or channels.

It comprises an electric diagnostic unit and up to four acoustic sensors.

#### Benefits

#### Benefits when pump monitoring

- Increased availability of the system through:
  - Advanced maintenance planning thanks to early recognition of defective components
  - Reduced downtimes (no fault locating necessary)
  - Increased maintenance intervals
  - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- · Increased productivity

#### Benefits when material flow monitoring

- · Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- · Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

# Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where an oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. against the pipe or channel wall.

If the acoustic diagnostic unit is used in potentially explosive areas, the sensors as well as the acoustic diagnostic unit can be installed in the Ex-zone.

If using the unit in potentially explosive areas, you have two op-

- Operation of the sensors over the safety barriers or
- Operation of the sensors over the SITRANS DA400 with explosion protection

#### Product features

Continuous and independent status monitoring:

- Of the flow control valves, for leaks
- Of the membranes, for material fatigue
- Of the temperature loading of the hydraulic oil
- Of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate control systems:

- · Via digital outputs
- Digitally, via PROFIBUS DP or PROFIBUS PA

Simple to operate and parameterize:

- · Locally, via digital display and keys
- PROFIBUS DP and PROFIBUS PA

#### Mode of operation

# Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

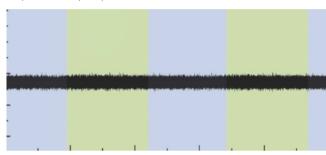
Acoustic sensors for pump monitoring

# SITRANS DA400 acoustic diagnostic unit

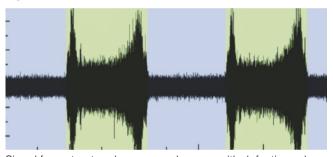
These oscillations are created by:

- Friction and impact of bulk solids in:
  - pipes, raceways or channels
  - chutes
  - conveyors
- Friction and impact of mechanical parts
- · Bursting of bubbles
- Cavitation
- Turbulence in gas and liquid flows

The following shows an example of signal levels at an oscillating displacement pump



Signal from structure-borne sound sensor with intact valve



Signal from structure-borne sound sensor with defective valve

#### Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave impacts on the sensor base is not important.

#### Mode of operation of the safety barrier

The safety barrier comprises intrinsically-safe circuits. These circuits serve to operate intrinsically-safe components such as sensors and to isolate safety from the non-hazardous area with the SITRANS DA400 diagnostic unit.

# Technical specifications

SITRANS DA400	Without Ex protection	With Ex protection
Input		
Acoustic channels		4
Cycle time	10	ms
Only for connection to intrinsically safe sensors with:		
• Max. voltage U <sub>o</sub>	-	≤ 5.5 V
• Max. current I <sub>o</sub>	-	≤ 70 mA
• Max. power P <sub>o</sub>	-	≤ 100 mW
• Internal capacitance C <sub>i</sub>	-	≤ 1.2 µF
<ul> <li>Internal inductance L<sub>i</sub></li> </ul>	-	Negligible
Universal inputs		4
Cycle time	80	ms
Low pass filter time	1	s
Universal analog current input		
• Load	< 105 Ω	< 12 Ω
Resolution	0.	1 %
Accuracy	0.5 %	
Fault signal	> 21 mA or < 3.6	mA (at 4 20 mA)
Alarm monitoring hysteresis	0.8	5 %
Static destruction limit	40 mA, 4 V	-
For connection with approved intrinsically safe circuits with:		
<ul> <li>Max. supply voltage U<sub>i</sub></li> </ul>	-	≤ 30 V
• Max. short-circuit current I <sub>i</sub>	-	≤ 100 mA
• Max. power P <sub>oi</sub>	-	≤ 1 W
• Internal capacitance C <sub>i</sub>	-	≤ 11 nF
• Internal inductance L <sub>i</sub>	-	$\leq 70~\mu H$
Universal input 24 V digital signal		
• Input resistance	> 1	9 kΩ
Signal level Low	< 4.5 V	or open
Signal level High	> 7 V	
Hysteresis	>	1 V
Static destruction limit	± 40 V	-
For connection with approved intrinsically safe circuits with:		
<ul> <li>Max. supply voltage U<sub>i</sub></li> </ul>	-	≤ 30 V
• Max. short-circuit current I <sub>i</sub>	-	≤ 100 mA
• Max. power Poi	-	≤ 1 W
• Internal capacitance C <sub>i</sub>	-	≤ 11 nF
• Internal inductance L <sub>i</sub>	-	≤ 70 µH

# Acoustic sensors for pump monitoring

# SITRANS DA400 acoustic diagnostic unit

SITRANS DA400	Without Ex protection	With Ex protection
Universal input closing contact		
For connection to closing contact with the maximum values:		
• Max. voltage U <sub>o</sub>	-	≤ 10 V
• Max. current I <sub>o</sub>	-	≤ 1 mA
• Max. power P <sub>o</sub>	-	≤ 5 mW
<ul> <li>Internal capacitance C<sub>i</sub></li> </ul>	-	≤ 11 nF
<ul> <li>Internal inductance L<sub>i</sub></li> </ul>	-	$\leq 70~\mu H$
8.2 V source for NAMUR signal (DIN EN 60947-5-6)		
Open circuit voltage	$8.2 \text{ V} \pm 0.3 \text{ V}$ , short-circuit proof	-
Input resistance	$< 950 \Omega$	-
Static destruction limit for incorrect wiring	+20 V/-10 V	-
Output		
<u>Digital outputs</u>	6	6 (applicable for NAMUR switch hardener)
Semiconductor relay	Individually iso- lated, short cir- cuit-proof	-
Switching voltage	24 V AC/36 V DC, any polarity	-
Destruction limit	35 V AC, 50 V DC	-
Max. switching current	100 mA	-
Signal status Low (no response)	-	≤ 1.2 mA (source to DIN 19234)
• Signal status High (response)	-	≥ 2.1 mA (source to DIN 19234)
For connection with an intrinsically safe switching amplifier to DIN 19234 with:		
<ul> <li>Max. supply voltage U<sub>i</sub></li> </ul>	-	≤ 15.5 V
• Max. short-circuit current I <sub>i</sub>	-	≤ 25 mA
• Max. power Poi	-	≤ 64 mW
<ul> <li>Internal capacitance C<sub>i</sub></li> </ul>	-	≤ 5.2 nF
• Internal inductance L <sub>i</sub>	-	Negligible
Conditions of use		
Installation conditions	Vertical wall mounting, cables fed in from below	
Climatic class	Class 4K4 accordi	ng to EN 60721-3-4
Mounting location	-	Zone 1 or zone 2
Permissible ambient temperature	-20 +60 °C (-4 +140 °F)	-
• Temperature class T5 – T1		-20 +60 °C (-4 +140 °F)
Temperature class T6		-20 +50 °C (-4 +122 °F)
Mechanical load	Class 4M3 according to EN 60721-3-4	
Degree of protection to EN 60529	IP	65
Electromagnetic Compatibility		
<ul> <li>Emitted interference and interference immunity</li> </ul>	To EN 61326 an	d NAMUR NE 21
Usage limits for water		
Delivery side		bar a
<ul> <li>Number of strokes</li> </ul>	Min. 4 min <sup>-1</sup> , ma	x. 10 500 min <sup>-1</sup>

SITRANS DA	1400 acoustic t	alagilostic utili
SITRANS DA400	Without Ex protection	With Ex protection
Design		
Weight (without options)	Approx	x. 2.5 kg
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (	(6.8 x 12.6 x 3.2)
Enclosure material	Makrolon (Polycarbonate + 20 % glass fiber)	Makrolon (Polycarbonate + 20 % glass fibers), surface attenuated with CrNi layer and painted
Electrical connection via screw terminals	<ul> <li>Rigid 2.5 mm (0.</li> <li>Flexible 1.5 mm</li> <li>Flexible with con 1.5 mm (0.59 inc</li> </ul>	(0.59 inch) nector sleeves
Cable inlet via plastic cable joints	• 2 x Pg 13.5 • 5 x Pg 11	
Power supply		
Rated voltage	24 V DC	16 V DC
Operating range	19 36 V DC	15 17 V DC
Current consumption	< 100 mA	< 40 mA
For connection with approved intrinsically safe circuits with:		
<ul> <li>Max. supply voltage U<sub>i</sub></li> </ul>	-	≤ 17.4 V
• Max. short-circuit current I <sub>i</sub>	-	≤ 191 mA
• Max. power Poi	-	≤ 1.35 W
<ul> <li>Internal capacitance C<sub>i</sub></li> </ul>	-	≤ 33 nF
<ul> <li>Internal inductance L<sub>i</sub></li> </ul>	-	$\leq$ 28 $\mu H$
Certificates and approvals		
Explosion protection to EN 50014, EN 50020 and EN 50021		
Intrinsic safety "i"		TÜV (German Technical Inspec- torate) 06 ATEX 2952
Marking	-	II 2(1) G EEx is [ia] IIC T6
Communication		
PROFIBUS DP	RS 485, switch- able terminating resistor	
Protocol	Cyclic with Master C1 and acyclic with Master C2	
Power supply	-	Bus-supplied
Bus voltage	-	9 24 V
Current consumption	-	10.5 mA $\pm$ 10 %
Bus connection with FISCO supply unit, ia/ib group IIC or IIB	-	Yes
Layer 1 and 2 from PROFIBUS PA, transfer technology from IEC 1158-2	-	
C2 connections	-	4 connections are supported in master class 2
Device profile	-	PROFIBUS PA Profil V3.0 Rev. 1, Class B
Device address	-	1 126 (126 factory-set)
PC parameterization software		ot included in the delivery)

Acoustic sensors for pump monitoring

# SITRANS DA400 acoustic diagnostic unit

Sensor for SITRANS DA400	
Setup	Piezoceramic sensor with pre-amplifier
	Encapsulated electronics
	• 4-wire cable with anti-kink sleeve
Conditions of use	
Permissible Ambient Temperature	-40 +110 °C (-40 +230 °F)
Degree of protection to EN 60529	IP66/IP68
Mechanical load	Class 4M7 according to EN 60721-3-4
Climatic class	Class 4K4 according to EN 60721-3-
Design	
Housing material	Stainless steel 1.4571 (316Ti SST)
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400
Weight	125 g (0.276 lb)
Mounting location	Zone 0/1 or zone 20/21/22
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)
Power supply	Power fed from device
Certificates and approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 2005 ATEX 2876 X
Marking	II 1 G EEx ia IIC T6/T5/T4 or II 1 D EEx ia D 20/21/22 T160
Permissible ambient temperature	
Category 1G	
- Temperature class T4, T5	-20 +60 °C (-4 +140 °F)
- Temperature class T6	-20 +50 °C (-4 +122 °F)
Category 2G	
- Temperature class T4	-40 +110 °C (-40 +230 °F)
- Temperature class T5	-40 +80 °C (-40 +176 °F)
- Temperature class T6	-20 +65 °C (-4 +149 °F)
Category 1D or 2D	
- Temperature class T160	-40 +110 °C (-40 +230 °F)

Ex barriers for sensors	
Application area	For the intrinsically safe supply of the acoustic sensors in zone 1; the safety barriers must be installed between the SITRANS DA400 acoustic diagnostic unit and the sensor if only the sensors are being operated in the Ex zone.
Input	A maximum of two sensors can be connected.
Conditions of use	
Degree of protection to EN 60529	IP20
Permissible Ambient Temperature	-20 +60 °C (-4 +140 °F)
Design	
Weight	115 g (0.254 lb)
Housing material	Plastic, polyamide
Type of installation	Installation on mounting rail NS 32 or NS 35/7.5.
	The acoustic diagnostic unit SITRANS DA400 and the safety barrier must be operated outside the Exzone.
Dimensions (W x H x D) in mm (inch)	68 x 77 x 42 (2.68 x 3.03 x 1.65)
Certificates and Approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 05 ATEX 2917 X
Marking	II (2) G [EEx ib] IIC

Selection and Ordering data	Article No.
Acoustic diagnostics unit SITRANS DA400 with local programming and display	7MJ2400- A 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Communication	
PROFIBUS DP	1 A
• PROFIBUS PA	2 B
Explosion protection	_
• Without	A
• With EEx ia/ib to ATEX <sup>1)</sup>	В
Application software	
For continuous condition monitoring of positive displacement pumps	1
for material flow monitoring in pipes, raceways and conveyors	2

Acoustic sensors for diagnostics unit SITRANS DA400	7MJ2000-1	==00
\[         \times \text{Click on the Article No. for the online configuration in the PIA Life Cycle Portal.}         \]		
Explosion protection		
• Without		Α
With EEx ia to ATEX		В
Cable (incl. pin and allen screw M6)		
20 m		В
40 m		С
100 m		F

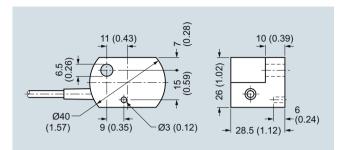
Safety barriers for sensors	7MJ2010-1AA
For rail mounting NS 32 and NS35/7.5 in non-hazardous areas Explosion-protected output circuit EEx ib	

<sup>1)</sup> Not in combination with trigger sensor.

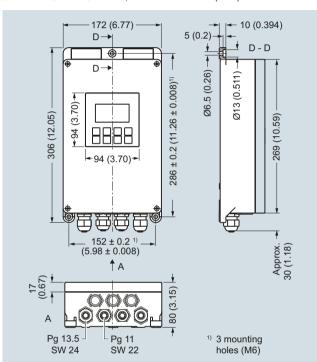
Acoustic sensors for pump monitoring

#### SITRANS DA400 acoustic diagnostic unit

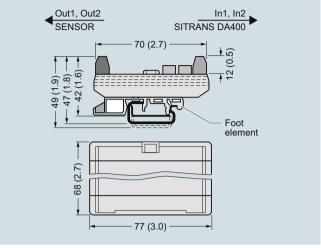
# Dimensional drawings



Sensor for SITRANS DA400, dimensions in mm (inch)

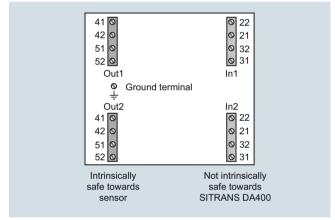


SITRANS DA400, dimensions in mm (inch)

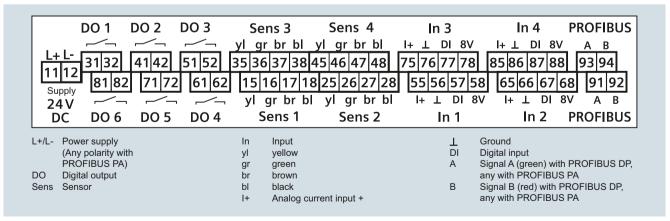


Safety barrier for SITRANS DA400, dimensions in mm (inch)

#### Schematics



Safety barrier for SITRANS DA400, terminal assignment



SITRANS DA400, terminal assignment

Acoustic sensors for material flow monitoring

#### SITRANS AS100 acoustic sensor

#### Overview



SITRANS AS100 is an acoustic sensor used for solids flow detection.

#### Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

# Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

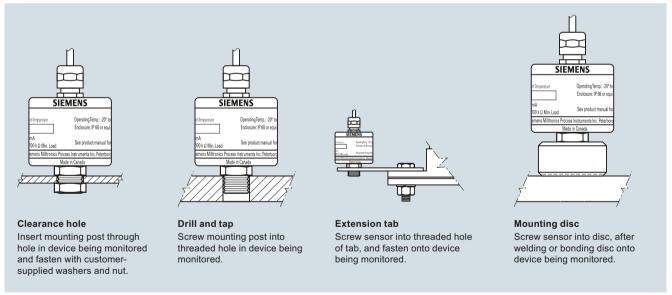
Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

 Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

#### Design



SITRANS AS100 mounting

# Acoustic sensors for material flow monitoring

# SITRANS AS100 acoustic sensor

Technical specifications	
Mode of Operation	
Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	<ul> <li>Detects burst filter bags in dust collection systems</li> <li>Detects material being conveyed in pneumatic conveyor lines</li> <li>Route confirmation in chute work</li> </ul>
Model	
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Operation	
Relative sensitivity	0.5 %/°C of reading, average over the operating range
Outputs	Analog, 0.08 10 V DC nominal, 100 k $\Omega$ minimum load impedance
Rated operating conditions	
Amb. temperature for enclosure  • Standard  • Extended	-20 +80 °C (-4 +176 °F)  • -40 +125 °C (-40 +257 °F) (CE only)  • -30 +120 °C (-22 +248 °F) option
Design	
Weight	0.4 kg (1 lb)
Enclosure	Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version], aluminum 231 on 2GD version]
Degree of protection	IP68 (waterproof)
Cable	
• Standard	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm <sup>2</sup> ), shielded
Extended	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm²) conductor, shielded
Power supply	20 30 V DC, 18 mA (typical)
Certificates and approvals	CE, RCM CSA/FM Class II, Div. 1, Group E, F and G (optional), ATEX II 2GD (optional), ATEX II 3D (optional), GOST-R

Selection and Ordering data		Ar	tic	le	Nc	).	
SITRANS AS100 Acoustic Sensor		71	ЛΗ	750	60-		
An acoustic sensor used for solids flow detection.			ij	0			
→ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.							
Sensor							
Standard temperature range [-20 +80 °C (-4 +176 °F)] <sup>1)</sup>	•	1					
Extended temperature range [-40 +125 °C (-40 +257 °F)] <sup>2)</sup>	•	3					
Extended temperature range [-30 +120 °C (-22 +248 °F)] <sup>3)</sup>	•	4					
Cable Length							
4 m (13.12 ft)			Α				
Sensor Mounting							
None	•		1	4			
Mounting disk			E	3			
Mounting tab			C	)			
Approvals							
CE, RCM					1		
CSA/FM Class II Div. 1, Group E, F, and G (includes ½" NPT female fitting)	•				3		
CSA Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)	•				4		
CE, RCM, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting)	•				5		
ATEX II 2GD, c/w cable gland <sup>4)</sup>					6		
1)							

- 1) Available with approval options 1, 3, 5, and 6 only
- 2) Available with approval option 1 only
- 3) Available with approval option 4 only
- $^{\rm 4)}$  Available with sensor option 1 only and sensor mounting option A only

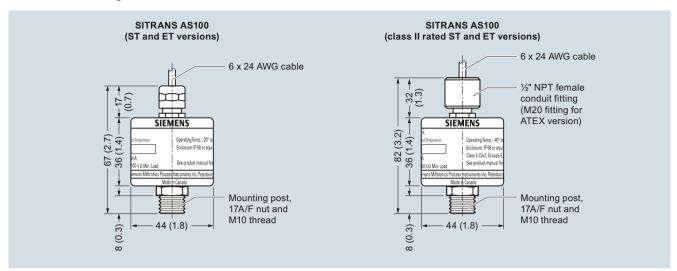
Selection and Ordering data	Order code
Further designs	
Please add <b>"-Z"</b> to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Operating Instructions	Article No.
English	A5E31952194
German	A5E31990912
French	A5E31993317
Spanish Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and operating instructions.	7ML1998-5DM21
Spare Parts	
Mounting tab	7MH7723-1AA
Mounting disk	7MH7723-1AB
½" NPT adapter kit for standard temperature range sensor, not Class II approved	7MH7723-1BW
M20 adapter kit for standard temperature range sensor, not Class II or ATEX approved	7MH7723-1BV
½" NPT adapter kit for extended temperature range sensor, not Class II approved Note: Adapter kits are not CSA Class II approved	7MH7723-1BX

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

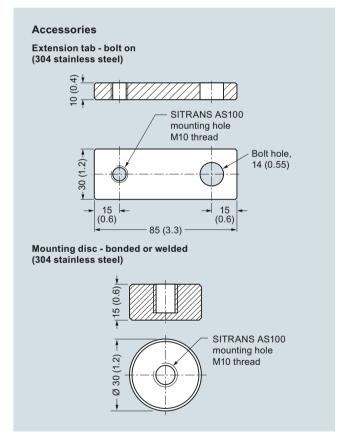
Acoustic sensors for material flow monitoring

#### SITRANS AS100 acoustic sensor

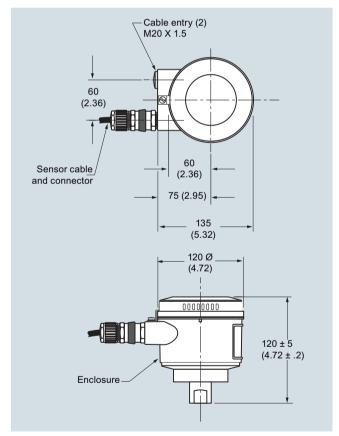
#### Dimensional drawings



SITRANS AS100, dimensions in mm (inch)



SITRANS AS100 accessories, dimensions in mm (inch)

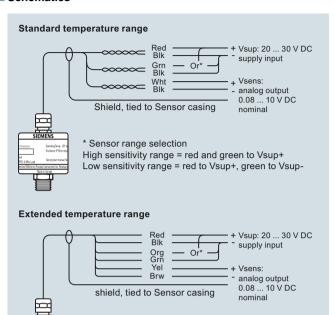


SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

Acoustic sensors for material flow monitoring

SITRANS AS100 acoustic sensor

# Schematics



#### Interconnection

The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.

High sensitivity range = red and orange to Vsup+ Low sensitivity range = red to Vsup+, orange to Vsup-

The following table provides a guideline for suitable wire gauges where distances are considerable.

\* Sensor range selection

Max. distance between sensor and supply (24 V or Control Unit).

	Wire	size	Dista	ance
AWG	mm	mm²	meters	feet
24	7 x 0.20	0.25	500	1 600
22	7 x 0.25	0.35	800	2 600
20	10 x 0.25	0.5	1 200	3 900

SITRANS AS100 connections

Acoustic sensors for material flow monitoring

#### **SITRANS CU02 control unit**

#### Overview



SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

#### Benefits

- 4 to 20 mA output
- Two programmable relays
- · Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

#### Application

SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

• Key applications: with SITRANS AS100 for bulk solids flow

#### Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

The SITRANS CU02 may be mounted up to 500 m (1 500 ft) from the sensor.

# Technical specifications

Mode of operation	
Measuring principle	Controller for acoustic sensing (SITRANS AS100)
Typical application	Connects to SITRANS AS100 to detect burst filter bag
Input	0 10 V DC, from sensor
Output	
Output signal	4 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 amp at 250 V AC non-inductive
Sensor excitation	26 V DC
Max. load	750 Ω
Rated operating conditions	
Installation conditions • Location	Indoor
Ambient conditions  • Ambient temperature for enclosure  • Relative humidity	-20 +50 °C (-4 +122 °F) 80 % for temperatures up to 50 °C (122 °F)
<ul><li>Degree of protection</li><li>Installation category</li><li>Pollution degree</li></ul>	IP20 II 2
Design	
Weight	550 g (18 oz)
Dimensions (W x H x D)	55 x 75 x 110 mm (2.2 x 3 x 4.4 inch)
Material enclosure	Polycarbonate
Mounting	DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor
Cable	2 twisted pair, 24 AWG (22 mm²), shielded. Mount up to 500 m (1 500 ft) from sensor
Display	Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment graphic symbols for operation status
Power supply	
Supply voltage	100, 115, 200, 230 V AC ± 15 %, 50/60 Hz, factory set
Power consumption	Max. 10 VA
Approvals	CSA <sub>US/C</sub> , CE, RCM, GOST-R

# Acoustic sensors for material flow monitoring

# SITRANS CU02 control unit

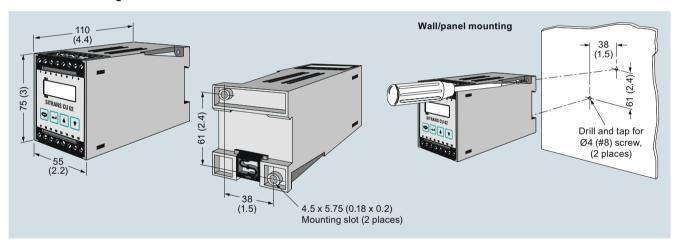
Selection and Ordering data		Art	ticl	e No.
SITRANS CU02 Control Unit		7M	H7	7562-
Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow		ľ		
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.				
Power Supply				
100 V AC	•	1		
115 V AC	•	2		
200 V AC	•	3		
230 V AC	٠	4		
Enclosure				
Standard DIN Rail	٠	1	١	
Approvals				
CSA <sub>US/C</sub> , CE, RCM	•		Α	

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
Operating Instructions	Article No.
English	7ML1998-5DN01
French	7ML1998-5DN11
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	7ML1998-5DN31

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

# Dimensional drawings

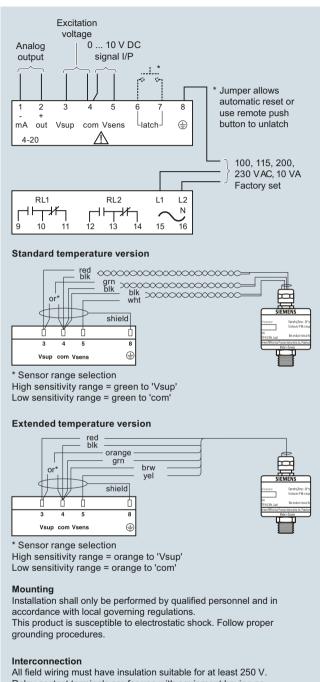


SITRANS CU02, dimensions in mm (inch)

Acoustic sensors for material flow monitoring

#### **SITRANS CU02 control unit**

#### Schematics



All field wiring must have insulation suitable for at least 250 V. Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.

The maximum allowable working voltage between adjacent relay contacts shall be 250 V. If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

Motion sensors

#### Milltronics MFA 4p motion failure alarm controller

#### Overview



MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP probes.

# Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

# Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

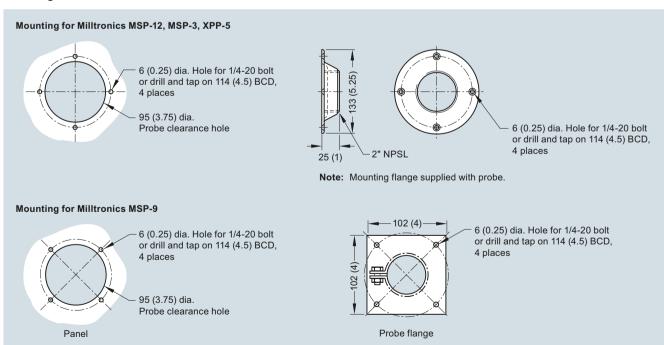
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. The CE approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

 Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

#### Design

#### Mounting



MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

Motion sensors

#### Milltronics MFA 4p motion failure alarm controller

#### **Probes**



#### Standard Milltronics MSP-12

- · Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



#### **Milltronics XPP-5**

- CSA hazardous approval (Class I, Div. 1,
- Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)

  Aluminum body that is fully potted

  Convenient mounting flange and locknut

- 3/4" NPT male hub connection
   Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X,6, IP67



#### High temperature Milltronics MSP-3

- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- · Amplifier remote mounted in enclosure  $140 \times 140 \times 100 \text{ mm}$  (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

#### Stainless high temperature Milltronics MSP-9

- Heavy-duty, high temperature 304 stainless steel
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (1/2" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
  - Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)



#### Milltronics RMA (Remote Mounted Amplifier)

- · Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (1/2" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Motion probes

#### Technical specifications

Mode of operation			
Measuring principle Motion monitor and alarm			
Typical application Monitoring loss of motion in tail pu screw flights, bucket elevators			
Features  • Switch selectable overspeed derspeed detection • Setpoint adjustment: 0.15 3 000 PPM • Adjustable start-up time dela 0 60 seconds • Visual indication of probe op and relay status			
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive		
Performance			
Repeatability	± 1 %		
Dead band	± 0.25 %		

Dynamic Range	0 7 200 PPM
Ambient Temperature Range	-20 +50 °C (-5 +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel)
	Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch)
	Optional: mild steel or 304 (1.4301) stainless steel
	203 x 254 x 102 mm (8 x 10 x 4 inch)
Enclosure material	Polycarbonate
	Optional: mild steel or stainless steel
Power Supply	100/115/200/230 V AC switch selectable, 50/60 Hz, 15 VA $\pm$ 10 % of rated voltage
Certificates and approvals	CE, RCM, CSA <sub>US/C</sub> , FM

Motion sensors

# Milltronics MFA 4p motion failure alarm controller

Selection and Ordering data	Article No.
MFA 4P Motion Failure Alarm Controller	7MH7144-
A highly sensitive single setpoint motion sensor system, used with MSP probes.	
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Enclosure	
NEMA 4X, polycarbonate enclosure	1
NEMA 4, painted mild steel enclosure	2
NEMA 4X, 304 (1.4301) stainless steel enclosure	3
Input Voltage	
100/115/200/230 V AC, 50/60 Hz, switch selectable	A
Speed detection version	
Standard, underspeed (U/S) or overspeed (O/S), switch selectable	A
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)	В
Approvals	
CE, RCM, CSA <sub>US/C</sub> , FM	2

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text	Y15
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) 483 x 584 x 203 mm (19 x 23 x 8 inch)	A35
Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)]	S50
Operating Instructions	Article No.
English	A5E33988839
French	7ML1998-5FM11
Spanish	7ML1998-5FM21
German Note: The operating instructions should be ordered as a separate item on the order.	7ML1998-5FM31
Spare Parts	
Relay	7MH7723-1DW
Transformer	7MH7723-1DX
Circuit Card, standard	7MH7723-1DU
Circuit Card, Slow speed	7MH7723-1DV
Lid with overlay for MFA 4p	7MH7723-1GY

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

_			
	Selection and Ordering data	Article No.	
	Milltronics RMA Remote Mounted Amplifier	7MH7145-	
	Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes.	0 =	
	Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		
	Enclosure		
	Aluminum enclosure, IP65, Type/NEMA 4X, ½" NPT entry	Α	
	Painted steel, Type/NEMA 4, IP65 rating	С	
	304 (1.4301) stainless steel enclosure,	D	
	Type/NEMA 4X, IP65 rating		
	Selection and Ordering data	Order code	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.20	C11
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
Operating Instructions	Article No.
English	A5E33988839
French	7ML1998-5FM11
Spanish	7ML1998-5FM21
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	7ML1998-5FM31
Spare Parts	
Card, RMA	7MH7723-1DT

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Motion sensors

# Milltronics MFA 4p motion failure alarm controller

·			
Selection and Ordering data	Article No.		
Milltronics Motion Sensing Probes	7MH7146-		
A series of motion sensing probes used with the MFA 4p.			
Milltronics MSP-3: heavy-duty, high temperature aluminum			
Milltronics MSP-9: heavy-duty, high temperature stainless steel			
Milltronics MSP-12: heavy-duty, general purpose			
Milltronics XPP-5: hazardous rated			
Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)			
→ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Cable Length			
Standard length (as described in Model options) <sup>1)</sup>	0		
Add Order code Y01 and plain text: "Total cable length m"			
Extended cable length 2 30 m	1		
(6.6 98.4 ft) <sup>2)</sup>			
Extended cable length 31 50 m	2		
(101.7 164 ft) <sup>4)</sup>	3		
Extended cable length 51 100 m (167.3 328.1 ft) <sup>4)</sup>	3		
Model [standard cable length/type]			
MSP-3, ½" NPT cable inlet <sup>3)</sup>	В		
[1.5 m (5 ft) high temperature cable] MSP-9 [1.5 m (5 ft) high temperature cable] <sup>3)</sup>	D		
MSP-12, ½" NPT cable inlet	E		
XPP-5 [1.5 m (5 ft) cable, (CSA Class I,	G		
Groups A, B, C and D; Class II Groups E,F, and G)]			
XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]	Н		
XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E, F, and G)]	J		
Approvals CE, RCM	A		

- 1) No Y01 needed in Order code for standard length
- $^{2)}\,$  Only available with model options B, D, G, H, J
- 3) MSP-3 and MSP-9 probes required the use of RMA (amplifier)
- $^{4)}$  Available with Model options G, H, and J only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description	Y01
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Cable gland kit	A57
Manufacturer's test certificate: According to EN 10204-2.2	C11
Operating Instructions	Article No.
English	A5E33988839
French	7ML1998-5FM11
Spanish	7ML1998-5FM21
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	7ML1998-5FM31
Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CR
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CS
Mounting bracket for MSP-9	7MH7723-1CT
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	7MH7723-1CU
Lid for MSP-9	7MH7723-1CV
Lid gasket, for MSP-3, MSP-9	7MH7723-1CW
Lid gasket, for MSP-7, MSP-12	7MH7723-1CX
Motion cable gland adaptor kit	7MH7723-1JU

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Motion sensors

# Milltronics MFA 4p motion failure alarm controller

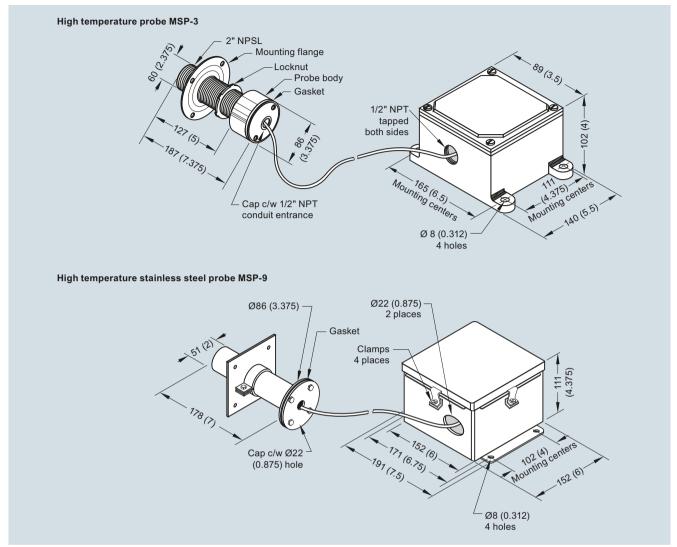
# Dimensional drawings

#### Type 4X/NEMA 4X/IP65 Polycarbonate Enclosure Type 4/NEMA 4/IP65 Painted Steel Enclosure & Type 4X/NEMA 4X/IP65 Stainless Steel Enclosure 160 (6.325) 203 (8.0) 82 (3.225) 152 (6.0) -Lid screws, 4 131 (5.138) -(0.75 places Φ Φ T ⊚ 254 (10.0) 273 (10.75) 240 (9.455) 228 (8.975) 75) Φ 6 ₽ . 61 Ø8 (0.31) - 178 (7.0) -Lid 227 (8.94) Suitable location for Enclosure conduit entrances. Mounting holes 4.3 (0.17) Mounting 102 (4) (0.83) diameter, 4 places screw 7 Suitable location for Conduit Entrance (customer specified) Standard Probe MSP-12 **Hazardous Locations XPP-5** 3/4" NPT 9.4 (0.37) 143 (5.63) Cable 60(2.375) 2" NPSL SJOOW-Mounting flange 18-3 Locknut Probe body Gasket Probe body (potted aluminum Nameplate junction box) Probe body (potted 171.5 (6.75)-nominal 187 (7.375) aluminum housing) Cap c/w 1/2" NPT 2" NSPL conduit entrance Locknut Mounting flange

MFA 4p and probe, dimensions in mm (inch)

Motion sensors

# Milltronics MFA 4p motion failure alarm controller



Probe, dimensions in mm (inch)

Motion sensors

#### Milltronics MSP-7 motion sensor

# Overview



Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

#### Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

# Application

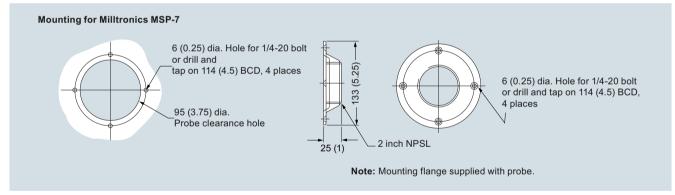
The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

• Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

# Design



Mounting for Milltronics MSP-7, dimensions in mm (inch)

#### Technical specifications

Mode of operation	
Measuring principle	Magnetic
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	<ul> <li>Rugged corrosion resistant aluminum body</li> <li>Low voltage operation</li> <li>Large dynamic range</li> <li>Threaded body for finite adjustment</li> </ul>
Output	NPN open collector

Performance		
Repeatability	± 1 %	
Dead band	± 0.25 %	
Dynamic Range	0 7 200 PPM	
Ambient Temperature Range	-40 +60 °C (-40 +140 °F)	
Design		
Enclosure rating	Type 4X/NEMA 4X/IP67	
Power Supply	21 28 V DC, 40 mA max.	
Certificates and approvals	CE, RCM	

Motion sensors

# Milltronics MSP-7 motion sensor

Selection and Ordering data	Arti	cle No.	
Milltronics Motion Sensing Probes	7MF	17146-	
Milltronics MSP-7: heavy-duty, 3 wire stand alone			
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.			
Cable Length			
Standard length (as described in Model options) <sup>1)</sup>	0		
Add Order code Y01 and plain text:			
"Total cable length m"  Extended eable length 2 20 m (6.6 09.4 ft)			
Extended cable length 2 30 m (6.6 98.4 ft)	Ľ		
Model [standard cable length/type]			
MSP-7, ½" NPT cable inlet [1.5 m (5 ft) cable]	K		
Approvals			
CE, RCM		A	

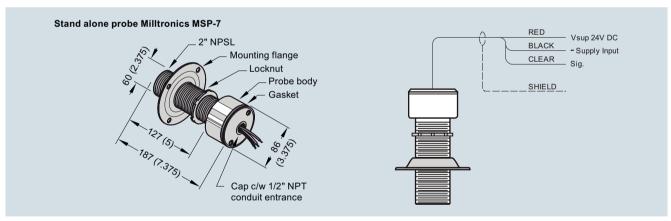
<sup>1)</sup> No Y01 needed in Order code for standard length

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description	Y01
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Cable gland kit	A57
Manufacturer's test certificate: According to EN 10204-2.2   ■	C11
Operating Instructions	Article No.
English	A5E34105798
Note: The operating instructions should be ordered as a separate item on the order.  This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	
Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CR
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	7MH7723-1CS
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	7MH7723-1CU
Lid gasket, for MSP-7, MSP-12	7MH7723-1CX
Motion cable gland adaptor kit	7MH7723-1JU

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 9/5 in the appendix.

#### Dimensional drawings



Stand alone probe Milltronics MSP-7, dimensions in mm (inch)

Motion sensors

#### SITRANS WM100 motion sensor

#### Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

#### Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- · Visual indication of target triggered pulse

#### Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

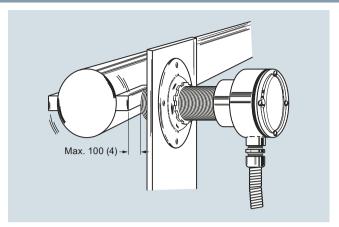
The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60  $^{\circ}$ C (-40 to +140  $^{\circ}$ F).

 Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

#### Design

#### Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.



SITRANS WM100 mounting, dimensions in mm (inch)

#### Technical specifications

Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Monitors absence or presence of motion in harsh conditions
Output	
Contact	1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation
Time delay	Start up: 10 14 seconds (5 7 seconds with 12 ppm jumper installed)
Zero Speed (selected via a common jumper)	• 5 seconds ± 1 (minimum speed 10 15 ppm) or • 10 seconds ± 2 (minimum speed 5 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 +60 °C (-40 +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, ¾" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm²) wire size
Gasketing	Neoprene
Display	Red LED for verification of pulses
Enclosure rating	Type NEMA 4x, 6, IP67
Dynamic range	Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute
Shipping weight	2 kg (4.4 lb)
Power supply	115 V AC/50 60 Hz, 7 VA     230 V AC/50 60 Hz, 7 VA     ± 10 % of rated voltage
Certificates and approvals	CSA <sub>US/C</sub> , CE, RCM

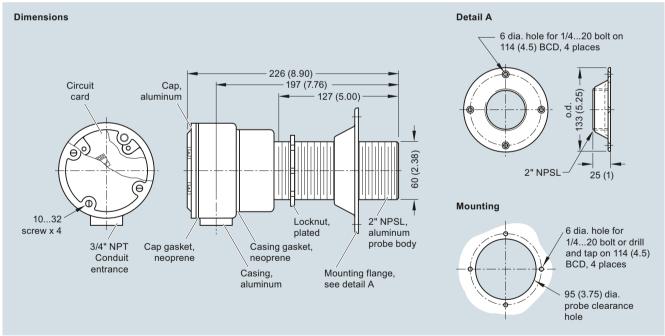
Motion sensors

# SITRANS WM100 motion sensor

Selection and Ordering data	Article No.
SITRANS WM100	7MH7158 -
A heavy-duty zero-speed alarm switch that does not require a controller.	0 A 0 0
→ Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.	
Model	
115 V AC	A
230 V AC	В

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's Test Certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Operating Instructions	Article No.
SITRANS WM100, English	7ML1998-5MW01
SITRANS WM100, German	7ML1998-5MW31
SITRANS WM100, French	A5E35674013
Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	
Locknut	7MH7723-1CR
Mounting flange	7MH7723-1CS
Motion cable gland adaptor kit	7MH7723-1JN

#### Dimensional drawings

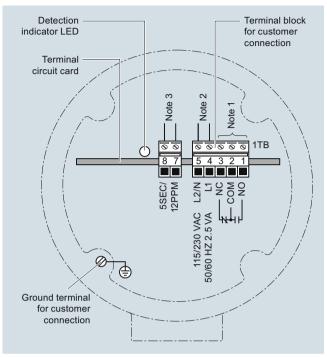


SITRANS WM100 mounting, dimensions in mm (inch)

Motion sensors

SITRANS WM100 motion sensor

# Schematics



SITRANS WM100 wiring

#### Notes:

- 1. Dry contacts shown in de-energized (alarm or shelf) state.
- 2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
- 3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

Notes

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Supplementary Components



7/2	Product overview
7/4 7/7	Isolating power supplies and Output isolators SITRANS 1100 SITRANS 1200
7/10 7/12 7/16	<b>Displays</b> SITRANS RD100 SITRANS RD200 SITRANS RD300
7/19	Remote data manager SITRANS RD500
7/24 7/30 7/34	WirelessHART products SITRANS AW200 - WirelessHART adapter SITRANS AW210 - WirelessHART adapter IE/WSN-PA LINK

You can download all instructions, catalogs and certificates for Supplementary Components free of charge at www.siemens.com/processinstrumentation

## **Supplementary Components** Product overview

#### Overview

	Application	Description	Catalog page	Programming Software
Isolating power supplies an	d Output isolators			
	Isolating power supply for supplying 2- and 3-wire transmitters and for connect- ing mA sources in the haz- ardous area	SITRANS I100 Isolating power supply with HART for rail mounting, with intrinsically-safe input.	7/4	-
	Output isolator for control- ling valve positioners, i/p converters or indicators in the hazardous area	SITRANS 1200  Output isolator with HART for rail mounting, with intrinsically-safe output	7/7	-
Displays				
	2-wire loop powered, NEMA 4X enclosed remote	SITRANS RD100	7/10	-
[1525]	digital display for process instrumentation and for hazardous locations	<ul> <li>Versatile loop-powered meter that displays process variables in level, flow, pressure, temperature and weighing applications</li> <li>FM and CSA approved device that can be installed in a range of environments, including hazardous areas</li> <li>Large, easy-to-read display</li> <li>Easy to install and set up using quick two-step</li> </ul>		
		process		
4-20	Universal input, panel mount remote digital display for process instrumentation. Supports RTD, TC, current and voltage inputs, and supporting software allows for remote configuration and data logging	SITRANS RD200  Universal remote display that accepts various inputs, making it an ideal fit for use with most field instruments  Standard panel mount display with optional enclosures  Two optional relays for alarm indication or process control applications  Meter Copy feature to reduce setup time, cost and errors	7/12	
		<ul> <li>RD Software supporting remote configuration, monitoring and logging for up to 100 displays</li> </ul>		
	A panel mount remote digital	SITRANS RD300	7/16	-
InPut SEtuP sees	display for process instru- mentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total and control appli- cations	<ul> <li>A remote display for level, flow, pressure, weighing, and other process instruments</li> <li>Acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications</li> <li>Data can be remotely collected, logged and presented on your local computer using the free downloadable RD software.</li> <li>Accepts a single or dual input of current and voltage</li> </ul>		
Remote data manager				
Sing State of the	Remote data monitoring providing integrated web access, alarm event handling, and data capture for instrumentation	SITRANS RD500  Supports up to 128 devices with the flexible I/O modules and Modbus serial devices, including field instruments  Out- of-the-box operation, no software required, works with standard web browser  Support Ethernet, cellular and PSTN communication  Data and alarming through FTP, Email, SMS, HTML and Modbus TPC  Up to 2 GB of data logging memory	7/19	-

## Supplementary Components Product overview

	Application	Description	Catalog page	Programming Software
WirelessHART products				
•	WirelessHART adapter to	SITRANS AW200 - WirelessHART adapter	7/24	SIMATIC PDM
	enable standard 4 20 mA or HART devices to wireless	Makes isolated information in HART field instruments airborne		<ul> <li>Local with HART modem</li> </ul>
mm	communication	<ul> <li>Permits predictive instead of preventive maintenance strategies</li> </ul>		<ul> <li>Wireless via WirelessHART</li> </ul>
		Enables 4 20 mA or HART devices to wireless communication		
		• Up to 4 HART devices can be connected		
		Power up one connected field instrument		
	Explosion protected Wire-	SITRANS AW210 - WirelessHART adapter	7/30	SIMATIC PDM
SIEMENS	lessHART adapter to enable standard 4 20 mA or HART devices to wireless communication	Wireless transfer of the process variable of a 4 to 20 mA device via direct connection	1,00	Local with HART modem
STEM END STRAKAR/20 WirelessART Adapter		Wireless communication with up to 8 HART field devices in multidrop mode		• Wireless via WirelessHART
The state of the s		Suitable for use in explosion-protected areas		
		• Loop-powered or external power supply		
		Supports burst mode and event notification for adapters and connected devices		
	Gateway for the connection	IE/WSN-PA LINK	7/34	_
	of WirelessHART field devices (HART V7.1) to Industrial Ethernet.	Connection of up to 100 WirelessHART devices	7,01	
		Approved for operation in hazardous areas in Zone 2		
		Open TCP/IP communication and Modbus TCP via the Ethernet interface		
8		Can be used with HART-OPC servers of the HART Communication Foundation		

Isolating power supplies and Output isolators

#### **SITRANS I100**

#### Overview



Analog input 0/4 to 20 mA

The isolating power supplies are used for the intrinsically safe operation of 2- and 3-wire transmitters and for connecting to intrinsically safe mA sources.

The 2- and 3-wire transmitters are supplied with auxiliary power from the transmitter supply unit.

For 2-wire transmitters the isolators transfer the HART communication signal bidirectionally.

#### Benefits

- Active output 0/4 to 20 mA
- Suitable for 2-, 3-wire transmitters, 2-wire HART transmitters and mA sources
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging for input and output (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

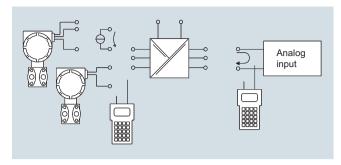
	Zones					
	0	1	2	20	21	22
Ex i interfaces	Χ	Χ	Χ	Χ	Χ	Χ
Installation in			Χ			Χ

#### Design

The HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I100 isolating power supply, function block diagram

#### Technical specifications

SITRANS I100 Isolating Power Supplies with HART				
Ex i input				
Input signal	0/4 20 mA with HART			
Functional range	0 24 mA			
Max. input current for mA sources	50 mA			
Transmitter supply voltage	≥ 16 V at 20 mA (for 2-, 3-wire)			
Supply voltage residual ripple	≤ 25 mV <sub>eff</sub>			
No-load voltage	≤ 26 V			
Short-circuit current	≤ 35 mA			
Input resistance (AC impedance HART)	≈ 500 <b>Ω</b>			
Input resistance for mA sources	30 Ω			
Communication signal (on 2-wire transmitters)	Bidirectional HART transmission, 0.5 30 kHz			
Output				
Output signal	0/4 20 mA with HART			
Load resistance R <sub>L</sub>	0 600 W (terminal 1+/2-) 0 379 W (terminal 3+/2-) (with internal 221 $\Omega$ resistance for HART)			
Residual ripple	≤ 40 µA <sub>eff</sub>			
No-load voltage	≤ 15.5 V			
Communication signal	Bidirectional HART transmission, 0.5 kHz 30 kHz			
Response time (10 % 90 %)	≤ 25 ms			
Transfer behavior Input/Output	1:1 (0 20 mA> 0 20 mA, 4 20 mA> 4 20 mA)			
<b>Measuring accuracy</b> Accuracy, typical data expressed as % of calibrated span at U <sub>N</sub> , 23 °C				
Linearity error	≤ 0.1 %			
Offset error	≤ 0.1 %			
Temperature influence	≤ 0.1 %/10 K			
Power supply effect within voltage range	≤ 0.01 %			
Load resistance effect	≤ 0.02 %			

# **Supplementary Components** Isolating power supplies and Output isolators

Part				SITRANS I100
Degree of protection of terminals Ambient conditions - Ambient temperature - Ambient temperature - Ambient temperature - Storage tem	Rated conditions		Error detection Ex i input	
- Ambient conditions  - Annibert temperature  - 20 + 49 °C + 79 °C (-4 + 140 °T/+ 158 °T) (-6	Degree of protection of enclosure	IP30	Open circuit	< 2 mA
Ambient temperature  (4 + 40 VT/19 ST) (5 + 40 VT/19 ST) (6 + 40 VT/19 ST) (6.	Degree of protection of terminals	IP20	Short-circuit	> 22 mA
Sibrage lamperature Petidother humidity (no condensation) Electromagnetic compatibility Rechanical specifications Screw terminals Petidother minimity Petidother in the following standards and regulations: Petidother in the followi	Ambient conditions		<ul> <li>Output behavior</li> </ul>	= Input signal
Storage temperature 40 +86°C (-40+176°F) - Relative humidity (ro condensation) File-termagnetic comparition) File-termagnetic comparition	<ul> <li>Ambient temperature</li> </ul>		<ul> <li>Output current at I<sub>in</sub> = 0</li> </ul>	$I_{out} = 0 \text{ mA}$
- Storage temperature - Ralative humidity (no condensating) - Electromagnetic compatibility - Electromagnetic compatibility - Residual regulations: EN 628.5 see in the industrial environment - Rigid - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Plexible - Residual ferrules - (0.00031 - 0.0009 in²) - Residual ferrules - (0.00031 - 0.000155 in²) - Residual ferrules - (0.00031 - 0.000156		` ,	Error detection output	
- Relative humidity (no condensation) Fleictromagnetic compatibility Fleictromagnetic compatibility Fleictromagnetic compatibility Fleictromagnetic compatibility Fleictromagnetic compatibility  Mechanical specifications Screw terminals  - One-wire connection - Rigid - Floxible - Flox	• Storage temperature	, , ,	Open circuit	< 2 mA
Tested under the following standards and regulations: Energy failure   Contact (30 V/100 mA), closed to grow supply failure   Contact (30 V/100 mA)   Contact (30 V/100 m	• .	,	Error messaging Ex i input/output	
Mechanical specifications   En 61384   Use in the industrial onvironment		3 50 70	<ul><li>Settings (LF switch)</li></ul>	Activated/deactivated
Mechanical specifications	Electromagnetic compatibility		<ul> <li>Error indication</li> </ul>	LED red "LF"
Screw terminals  One-wire connextion  - Rigid  One-wire connection  One-wire c		EN 61326-1 Use in the industrial		to ground in case of error
• One-wire connextion  - Rigid  - Rigid  - Rigid  - Rigid  - Rigid  - Plexible  - Plexible  - Plexible  - Plexible  - Rigid  - Plexible  - Rigid  - Plexible  - Plexible  - Rigid  - Rigid  - Plexible  - Rigid  - Rigid  - Rigid  - Plexible  - Plex	Mechanical specifications			
- Rigid  - Plexible  - Plexible with and ferrules (without/with plastic ferrule)  - Provine connection  - Pitigid  - Plexible	Screw terminals		Certificates and approvals	
- Flexible  - Plexible with end ferrules (0.00031 0.0039 in²)  - Plexible with end ferrules (0.00031 0.0039 in²)  - Two-wire connection - Rigid  - Plexible  - Plexibl	One-wire connextion		Explosion protection ATEX	
- Flexible  - Plexible with end ferrules (without/with plastic ferrule) - Rigid - (without/with plastic ferrule) - (without/with plastic ferrule) - Rigid - (without/with plastic ferrule) - Rigid - (without/with plastic ferrule) - (with ax voltage Un) - (with ax voltage Un) - (with ax voltage Un) - (with ax	- Rigid		<ul> <li>EC type-examination certificate</li> </ul>	DMT 03 ATEX E 010 X
Floxible with and ferrules   0.25 mm² (0.0003 0.0039 in²)   Installation	- Flevible		<ul> <li>Degree of protection</li> </ul>	
- Trick of with out ferrules (without with plastic terrule) (0.00039 0.0039 in²)  - Two-wire connection - Rigid  0.2	- FIGAIDIC			· · · · ·
Other approvals   USA (FM)   Kanada (CSA)			Installation	
- Rigid - Rigi	, , , , , , , , , , , , , , , , , , , ,	(0.00039 0.0039 in <sup>2</sup> )	Other approvals	
- Flexible  0.2 15 mm² (0.00031 0.00155 in²)  - Flexible with end ferrules  0.25 1 mm² (0.00031 0.0023 in²)  - Flexible with end ferrules  0.25 1 mm² (0.00039 0.0155 in²)  Weight  Approx. 160 g (0.35 ib)  Type of installation  On DIN rail according to EN 50022 (NSS5/15; NS35/7.5)  Mounting position  Vertical or horizontal  Enclosure material  PA 6.6  Fire protecting class (UL-94)  V0  Auxillary power  Rated voltage U <sub>N</sub> 24 V DC  Voltage range  18 31.2 V  Residual ripple within voltage range  Rated current (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power loss (at U <sub>N</sub> , R <sub>1</sub> = 250 Ω)  Undervoltage monitoring  Yes (no faulty module/output states)  Galvanic isolation  • Test voltage according to EN 60079-11  Ex i input to output  - Ex i input to auxiliary power  1.5 kV AC  • Test voltage according to EN 60079-17  - Ex i input to Error contact  • Test voltage according to EN 60079-17  - Ex i input to auxiliary power  350 V AC		0.0 12	care, approvate	, ,
- Flexible with end ferrules  (0.00031 0.0023 in²)  (0.00039 0.0023 in²)  (0.00039 0.0023 in²)  (0.00039 0.00155 in²)  (0.00039 0.00155 in²)  (0.00039 0.00155 in²)  Approx. 160 g (0.35 lb)  On DIN rail according to EN 50022 (NS35/15. NS35/7.5)  Mounting position  Fenciosure material  Fine protecting class (UL-94)  Auxillary power  Rated voltage U <sub>N</sub> Voltage range  Rated voltage U <sub>N</sub> Power consumption (U <sub>N</sub> , 20 mA)  Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω)  Operation indicator  Reverse polarity protection  Undervoltage according to EN 60079-11  Ex i input to output  - Ex i input to output  - Ex i input to extinct in a content of the work of the service of	- Rigia			Shipping (DNV)
- Flexible with end ferrules  O.25 1 mm² (0.00039 0.00155 in²)  Weight  Type of installation  Mounting position  Enclosure material  Fire protecting class (UL-94)  Auxillary power  Rated voltage U <sub>N</sub> Voltage range  Rated current (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power considerior (U <sub>N</sub> , 20 mA)  Operation indicator  Reverse polarity protection  Undervoltage monitoring  * Yes (no faulty module/output states)  Galvanic isolation  * Text input to auxiliary power  - Text voltage according to EN SU AC  * Test voltage according to EN SU AC	- Flexible	0.2 1.5 mm <sup>2</sup>	Safety specifications (CENELEC)	
(0.00039			<ul> <li>Max. voltage U<sub>o</sub></li> </ul>	27 V
Weight Type of installation  Approx. 160 g (0.35 lb) On DIN rail according to EN 50022 (NS35/15; NS35/7.5)  Mounting position Vertical or horizontal Enclosure material PA 6.6 Fire protecting class (UL-94)  Auxiliary power Rated voltage U <sub>N</sub> Voltage range Rated voltage U <sub>N</sub> Power consumption (U <sub>N</sub> , 20 mA) Power loss (at U <sub>N</sub> , R <sub>I</sub> = 250 Ω) Operation indicator Reverse polarity protection Undervoltage monitoring  * (See "Certification")  Galvanic isolation  * (Sex Value)  * (Se	- Flexible with end ferrules		<ul> <li>Max. current I<sub>o</sub></li> </ul>	88 mA
Type of installation  On DIN rail according to EN 50022 (NS35/15; NS35/7.5)  Mounting position  Enclosure material  Enclosure material  PA 6.6  Fire protecting class (UL-94)  Auxiliary power  Rated voltage U <sub>N</sub> Voltage range  Rated voltage U <sub>N</sub> Residual ripple within voltage range  Rated current (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power loss (at U <sub>N</sub> , P <sub>L</sub> = 250 Ω)  Operation indicator  Reverse polarity protection  Undervoltage monitoring  Galvanic isolation  • Test voltage according to EN 60079-11  - Ex i input to auxiliary power  1.5 kV AC  • Test voltage according to EN 50178  - Output to auxiliary power  3 on nectable capacitance C <sub>0</sub> for IIC/IIB  • Max. connectable inductance L <sub>1</sub> • Max. connectable inductance C <sub>1</sub> and inductance L <sub>1</sub> • Max. connectable under to voltage U <sub>m</sub> • Max. connectable current I <sub>1</sub> • Max. connectable voltage U <sub>0</sub> • Max. connectable under to voltage under to volta	Weight	· ·	<ul> <li>Max. power P<sub>o</sub></li> </ul>	576 mW
Mounting position  Vertical or horizontal Enclosure material PA 6.6 Fire protecting class (UL-94)  Auxiliary power Rated voltage U <sub>N</sub> Voltage range Residual ripple within voltage range Rated current (U <sub>N</sub> , 20 mA) Power consumption (U <sub>N</sub> , 20 mA) Power consumption (U <sub>N</sub> , 20 mA) Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) Undervoltage monitoring  Pa (ne faulty module/output states)  Galvanic isolation  • Test voltage according to EN 150178 EN 150178 - Output to auxiliary power  350 V Ac  • Max. connectable inductance C <sub>1</sub> and inductance C <sub>1</sub> and inductance L <sub>1</sub> • Insulation voltage U <sub>m</sub> • Insulation voltage U <sub>m</sub> • Max. connecting mA sources:  • Max. output voltage U <sub>0</sub> • Max. connectable voltage U <sub>0</sub> • Power consumption (U <sub>N</sub> , 20 mA) • Internal capacitance Ci and inductance L <sub>1</sub> • For more information and value combinations	•	On DIN rail according to	<ul> <li>Max. connectable capacitance C<sub>o</sub> for IIC/IIB</li> </ul>	90 nF/705 nF
Enclosure material Fire protecting class (UL-94)  Auxiliary power  Rated voltage U <sub>N</sub> Power consumption (U <sub>N</sub> , 20 mA)  Power consumption indicator  Reverse polarity protection  Indervoltage monitoring  • Test voltage according to EN 620 type  • Test voltage according to EN 50178  • Output to auxiliary power  • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Insulation voltage U <sub>m</sub> • Insulation voltage U <sub>m</sub> • When connecting Mas ources:  • Max. connectable voltage U <sub>0</sub> • Max. connectable current l <sub>i</sub> • Negligible  • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Insulation voltage U <sub>m</sub> • When connecting Mas ources:  • Max. connectable current l <sub>i</sub> • Max. connectable current l <sub>i</sub> • Internal capacitance C <sub>i</sub> and inductance L <sub>i</sub> • Insulation voltage U <sub>m</sub> • Max. connectable current l <sub>i</sub> • Internal capacitance C <sub>i</sub> • Max. connectable current l <sub>i</sub> • Max. connectable current l <sub>i</sub> • Internal capacitance C <sub>i</sub> • Max. connectable current l <sub>i</sub> • For more information and value combinations  • For more information and value combinations  • For more information and value combinations  • Ex i input to output  • Ex i input to output  • Ex i input to auxiliary power  • Tast voltage according to EN 50178  • Output to auxiliary power  • Tast voltage according to EN 50178  • Output to auxiliary power  • Tast voltage according to EN 50178	Mounting position			2.3 mH/14 mH
Fire protecting class (UL-94)       V0         Auxiliary power       24 V DC         Notiage range       18 31.2 V       • When connecting mA sources:         Voltage range       23.6 V <sub>SS</sub> • Max. output voltage U₀       4.1 V         Residual ripple within voltage range       3.6 V <sub>SS</sub> • Max. connectable voltage U₀       30 V         Rated current (U <sub>N</sub> . 20 mA)       70 mA       • Internal capacitance Ci and inductance Ci and inductance Ci and inductance Li       100 mA         Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω)       1.3 W       • For more information and value combinations       See "Certification"         Reverse polarity protection       Yes (no faulty module/output states)       • For more information and value combinations       See "Certification"         Galvanic isolation       • Test voltage according to EN 60079-11       1.5 kV AC       • Ex i input to output       1.5 kV AC         • Test voltage according to EN 50178       1.5 kV AC       • Test voltage according to EN 50178       1.5 kV AC         • Test voltage according to EN 50178       • Output to auxiliary power       350 V AC	Enclosure material	PA 6.6	•	Negligible
Rated voltage U <sub>N</sub> Voltage range  18 31.2 V  Residual ripple within voltage range  Rated current (U <sub>N</sub> , 20 mA)  Rated current (U <sub>N</sub> , 20 mA)  Rated current (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω)  Operation indicator  Reverse polarity protection  Undervoltage monitoring  *Yes (no faulty module/output states)  Galvanic isolation  *Test voltage according to EN 60079-11  - Ex i input to auxiliary power  1.5 kV AC  *When connecting mA sources:  - Max. output voltage U <sub>0</sub> 4.1 V  And Connectable current I <sub>1</sub> 100 mA  Negligible  *Por more information and value combinations  See "Certification"  *See "Certification"  *See "Certification"  *Test voltage according to EN 60079-11  - Ex i input to auxiliary power  1.5 kV AC  *Test voltage according to EN 50178  - Output to auxiliary power  350 V AC	Fire protecting class (UL-94)	VO		
Voltage range  Residual ripple within voltage range  Rated current (U <sub>N</sub> , 20 mA)  Power consumption (U <sub>N</sub> , 20 mA)  Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω)  Operation indicator  Reverse polarity protection  Undervoltage monitoring  * Test voltage according to EN 60079-11  - Ex i input to output - Ex i input to existing power  • Test voltage according to EN 50178 - Output to auxiliary power  • Test voltage according to EN 50178 - Output to auxiliary power  • Test voltage according to EN 50178 - Output to auxiliary power  • Test voltage according to EN 50178 - Output to auxiliary power  • Test voltage according to EN 50178 - Output to auxiliary power  • See "Certification"  • Max. connectable voltage U <sub>0</sub> • Pax. connectable voltage U <sub>1</sub> • For more information and value combinations	Auxiliary power		<ul> <li>Insulation voltage U<sub>m</sub></li> </ul>	253 V
Residual ripple within voltage range  Rated current (U <sub>N</sub> , 20 mA) 70 mA  Power consumption (U <sub>N</sub> , 20 mA) 1.7 W  Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) 1.3 W  Operation indicator Green "PWR" LED  Reverse polarity protection Yes  Undervoltage monitoring Yes (no faulty module/output states)  Galvanic isolation  • Test voltage according to EN 60079-11  - Ex i input to output 1.5 kV AC  - Ex i input to Error contact 1.5 kV AC  • Test voltage according to EN 50178  - Output to auxiliary power 350 V AC	Rated voltage U <sub>N</sub>	24 V DC	<ul><li>When connecting mA sources:</li></ul>	
range Rated current (U <sub>N</sub> , 20 mA) Power consumption (U <sub>N</sub> , 20 mA) Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) Operation indicator Reverse polarity protection Undervoltage monitoring  • Test voltage according to EN input to output - Ex i input to output - Ex i input to auxiliary power  • Test voltage according to EN 50178 - Output to auxiliary power  • Max. connectable current I <sub>i</sub> - Internal capacitance Ci and inductance L <sub>i</sub> • For more information and value combinations	Voltage range	18 31.2 V		4.1 V
Rated current (U <sub>N</sub> , 20 mA) 70 mA  Power consumption (U <sub>N</sub> , 20 mA) 1.7 W  Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) 1.3 W  Operation indicator Green "PWR" LED  Reverse polarity protection Yes  Undervoltage monitoring Yes (no faulty module/output states)  Galvanic isolation  • Test voltage according to EN 60079-11  - Ex i input to output 1.5 kV AC  - Ex i input to auxiliary power EN 50178  - Output to auxiliary power 350 V AC		≤ 3.6 V <sub>SS</sub>		
Power consumption (U <sub>N</sub> , 20 mA) Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) Operation indicator Reverse polarity protection Ves Undervoltage monitoring  *Test voltage according to EN input to auxiliary power EN input to Error contact  *Test voltage according to EN 50178 Output to auxiliary power  *Test voltage according to EN 50178 Output to auxiliary power  *Test voltage according to EN 50178 Output to auxiliary power  *Test voltage according to EN 50178 Output to auxiliary power  *Test voltage according to EN 50178	· ·	70 ~ 4		
Power loss (at U <sub>N</sub> , R <sub>L</sub> = 250 Ω) Operation indicator Reverse polarity protection Undervoltage monitoring Yes  Galvanic isolation  • Test voltage according to EN input to auxiliary power - Ex i input to Error contact - Ex i input to Error contact • Test voltage according to EN 50178 - Output to auxiliary power  • Output to auxiliary power  • Tom more information and value combinations  • For more information and value combinations				Negligible
Operation indicator Reverse polarity protection Yes Undervoltage monitoring Yes (no faulty module/output states)  Galvanic isolation  • Test voltage according to EN 60079-11 - Ex i input to output - Ex i input to auxiliary power - Ex i input to Error contact  • Test voltage according to EN 50178 - Output to auxiliary power  350 V AC			· ·	See "Certification"
Reverse polarity protection  Undervoltage monitoring  Yes (no faulty module/output states)  Galvanic isolation  Test voltage according to EN 60079-11  Ex i input to output  Ex i input to auxiliary power  Ex i input to Error contact  Test voltage according to 1.5 kV AC  Ex i input to Error contact  Test voltage according to EN 50178  Output to auxiliary power  350 V AC			combinations	
Undervoltage monitoring  Yes (no faulty module/output states)  Galvanic isolation  Test voltage according to EN 60079-11  Ex i input to output  Ex i input to auxiliary power  Ex i input to Error contact  Test voltage according to EN 50178  Output to auxiliary power  350 V AC	·			
Galvanic isolation  ● Test voltage according to EN 60079-11  - Ex i input to output 1.5 kV AC  - Ex i input to auxiliary power 1.5 kV AC  - Ex i input to Error contact 1.5 kV AC  ● Test voltage according to EN 50178  - Output to auxiliary power 350 V AC	• • •	Yes (no faulty module/output		
EN 60079-11  - Ex i input to output  - Ex i input to auxiliary power  - Ex i input to auxiliary power  - Ex i input to Error contact  1.5 kV AC  - Test voltage according to EN 50178  - Output to auxiliary power  350 V AC	Galvanic isolation			
<ul> <li>Ex i input to auxiliary power</li> <li>Ex i input to Error contact</li> <li>Test voltage according to EN 50178</li> <li>Output to auxiliary power</li> <li>350 V AC</li> </ul>				
- Ex i input to Error contact 1.5 kV AC  • Test voltage according to EN 50178  - Output to auxiliary power 350 V AC	- Ex i input to output	1.5 kV AC		
Test voltage according to EN 50178  Output to auxiliary power 350 V AC	- Ex i input to auxiliary power	1.5 kV AC		
EN 50178  - Output to auxiliary power 350 V AC	- Ex i input to Error contact	1.5 kV AC		
- Error contact to auxiliary power 350 V AC	- Output to auxiliary power	350 V AC		
and output	- Error contact to auxiliary power and output	350 V AC		

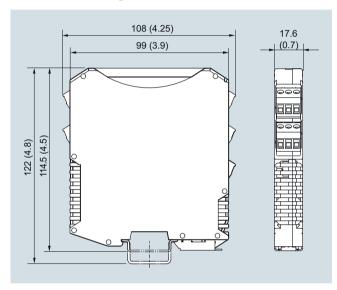
Isolating power supplies and Output isolators

#### **SITRANS I100**

Article No.
7NG4124-0AA00
7NG4998-1AA
7NG4998-1AB

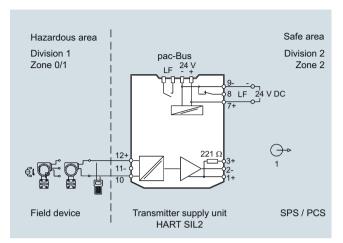
#### Dimensional drawings

Available ex stock.



SITRANS I100 isolating power supply with HART, dimensions in mm (inch)  $\,$ 

## Schematics



SITRANS I100 isolating power supply with HART, connection diagram



SITRANS I100 isolating power supply with HART, output configuration

Isolating power supplies and Output isolators

SITRANS 1200

#### Overview



Analog output 0/4 to 20 mA for HART

The output isolators are used for the intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2 and SITRANS VP300) is also possible. The units transfer a superimposed HART communication signal bidirectionally.

#### Benefits

- For HART output signals 0/4 to 20 mA
- Intrinsically safe output [Ex ia] IIC
- · Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

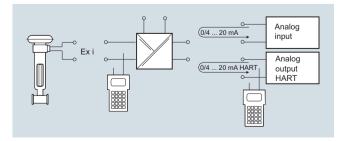
	Zones					
	0	1	2	20	21	22
Ex i interface	Χ	Χ	Χ	Χ	Χ	Χ
Installation in			Χ			Χ

#### Design

The HART output isolator is comprised of a compact plastic housing (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I200 output isolator, function block diagram

#### Technical specifications

SITRANS I200 output isolator with	HART
Input	
Input signal	0/4 20 mA with HART
Functional range	0 24 mA
Max. input current	50 mA
Input resistance (changeable switch LI)	225 Ω/550 Ω
Communication signal	Bidirectional HART transmission, 0.5 30 kHz
Ex i output	
Output signal	0/4 20 mA with HART
Connectable load resistance	0 800 Ω
Min. load resistance for short-circuit monitoring	150 Ω
Residual ripple	≤ 50 mV
No-load voltage	≤ 25.6 V
Response time (10 % 90 %)	≤ 25 ms
Transfer behavior Input/Output	1:1 (0 20 mA> 0 20 mA, 4 20 mA> 4 20 mA)
Measuring accuracy Accuracy, typical data expressed as % of calibrated span at U <sub>N</sub> , 23 °C	
Linearity error	≤ 0.1 %
Offset error	≤ 0.1 %
Temperature influence	≤ 0.1 %/10 K
Power supply effect within voltage range	≤ 0.01 %
Load resistance effect	≤ 0.02 %
Rated conditions	
Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
Ambient temperature	-20 +70 °C (-4 +158 °F) (see "Operating instructions")
Storage temperature	-40 +80 °C (-40 +176 °F)
Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial

environment

Isolating power supplies and Output isolators

#### SITRANS I200

SITRANS I200	
Mechanical specification	
Screw terminals	
One-wire connection	
- Rigid	0.2 2.5 mm <sup>2</sup> (0.00031 0.0039 in <sup>2</sup> )
- Flexible	0.2 2.5 mm <sup>2</sup> (0.00031 0.0039 in <sup>2</sup> )
<ul> <li>Flexible with end ferrules (without/with plastic ferrule)</li> </ul>	0.25 2.5 mm <sup>2</sup> (0.00039 0.0039 in <sup>2</sup> )
• Two-wire connection	
- Rigid	0.2 1 mm <sup>2</sup> (0.00031 0.00155 in <sup>2</sup> )
- Flexible	0.2 1.5 mm <sup>2</sup> (0.00031 0.0023 in <sup>2</sup> )
- Flexible with end ferrules	0.25 1 mm <sup>2</sup> (0.00039 0.00155 in <sup>2</sup> )
Weight	Approx. 160 g (0.35 lb)
Type of installation	On DIN rail according to EN 50022 (NS35/15; NS35/7.5)
Mounting position	Vertical or horizontal
Enclosure material	PA 6.6
Fire protecting class (UL-94)	VO
Auxiliary power	
Rated voltage U <sub>N</sub>	24 V DC
Voltage range	18 31.2 V
Residual ripple within voltage range	≤ 3.6 V <sub>SS</sub>
Rated current (U <sub>N</sub> , 20 mA)	80 mA
Power consumption (U <sub>N</sub> , 20 mA)	1.3 W
Power loss (at $U_N$ , $R_L = 500 \Omega$ )	1.1 W
Operation indicator	Green "PWR" LED
Reverse polarity protection	Yes
Undervoltage monitoring	Yes (no faulty module/output states)
Galvanic isolation	
Test voltage according to EN 60079-11	
- Ex i output to input	1.5 kV AC
- Ex i output to auxiliary power	1.5 kV AC
- Error contact to Ex i output	1.5 kV AC
<ul> <li>Test voltage according to EN 50178</li> </ul>	
- Input to auxiliary power	350 V AC
- Error contact to auxiliary power and input	350 V AC
Error detection Ex i output	
Open circuit	> 10 kΩ
Short-circuit	< 15 Ω
Input behavior	> 6 kΩ
Open-circuit detection only for input current	≥ 3.6 mA
• Settings (LF switch)	Activated/deactivated
• Error indication	LED red "LF"
Error messaging and power supply failure	<ul> <li>Contact (30 V/100 mA), closed to ground in case of error</li> <li>pac-Bus, floating contact (30 V/100 mA)</li> </ul>

Certificates and approvals	
Explosion protection ATEX	
• EC type-examination certificate	DMT 03 ATEX E 012 X
Degree of protection	II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD]
Installation	In Zone 2, Div. 2 and in the safe area
Other approvals	USA (FM) Canada (CSA) Shipping (DNV)
Safety specifications (CENELEC)	
<ul> <li>Max. voltage U<sub>o</sub></li> </ul>	25.6 V
• Max. current I <sub>o</sub>	96 mA
• Max. power P <sub>o</sub>	605 mW
$\bullet$ Max. connectable capacitance $\mathrm{C}_{\mathrm{0}}$ for IIC/IIB	103 nF/800 nF
<ul> <li>Max. connectable inductance L<sub>o</sub> for IIC/IIB</li> </ul>	1.9 mH/11 mH
<ul> <li>Internal capacitance C<sub>i</sub> and inductance L<sub>i</sub></li> </ul>	Negligible
<ul> <li>Insulation voltage U<sub>m</sub></li> </ul>	253 V
<ul> <li>For more information and value combinations see "Certification".</li> </ul>	

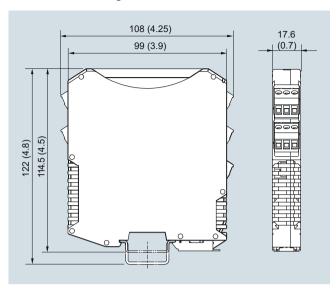
Selection and Ordering data	Article No.
SITRANS I200 output isolator with HART	7NG4131-0AA00
For rail mounting, input 0/4 20 mA, output 0/4 20 mA, intrinsically safe	
Accessories	
pac-Bus basic set With 5 single elements and 1 terminal set (beginning and end)	7NG4998-1AA
pac-Bus extension set  With 5 single elements	7NG4998-1AB

Available ex stock.

Isolating power supplies and Output isolators

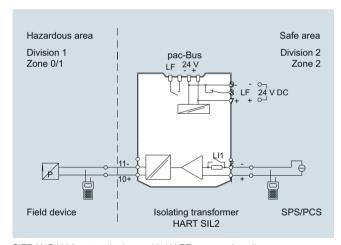
SITRANS 1200

## Dimensional drawings



SITRANS I200 output isolator with HART, dimensions in mm (inch)

#### Schematics



SITRANS I200 output isolator with HART, connection diagram

Displays

#### **SITRANS RD100**

#### Overview



The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

#### Benefits

- Easy setup
- · Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

#### Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas.

It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85  $^{\circ}$ C (-40 to +185  $^{\circ}$ F), adding only 1 V to the loop.

The RD100 has a large 1 inch (2.54 cm) high display making it easy to read.

Calibration consists of a quick, two-step process involving the adjustment of only two non-interacting potentiometers.

#### **Key Applications**

Remotely displays process variables in level, flow, pressure, temperature and weighing applications, in a 4 to 20 mA loop.

#### Technical specifications

Mode of operation			
Measuring principle	Analog to digital conversion		
Measuring range	4 20 mA		
Measuring points	1 instrument only		
Accuracy	± 0.1 % of span ± 1 count		
Rated operating conditions			
Ambient conditions			
Operating temperature range	-40 +85 °C (-40 +185 °F)		
Design			
Weight	340 g (12 oz)		
Material (enclosure)	Impact-resistant glass filled polycarbonate body and clear polycarbonate cover		
Degree of protection	NEMA 4X, IP67		

Power supply			
External loop power supply	30 V DC max.		
Display	• 1 inch (2.54 cm) high LCD		
	• Numeric range from -1 000 +1 999		
Certificates and approvals			
Hazardous			
Intrinsically Safe	<ul> <li>CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4</li> </ul>		
	<ul> <li>CSA/FM Class I, Zone 0, Group IIC</li> </ul>		
Non-incendive	<ul> <li>CSA/FM Class I, Div. 2, Groups A, B, C, D</li> </ul>		
	<ul> <li>CSA/FM Class II and III, Div. 2, Groups F and G</li> </ul>		
Options			
Mounting	<ul><li>2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel)</li><li>Panel mounting kit</li></ul>		

Selection and Ordering data	Article No.	
SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.		7ML5741- A A 0 0 - 0
Conduit hole location (½ inch)		
None	▶•	1
Bottom	▶•	2
Rear	•	3
Тор	•	4

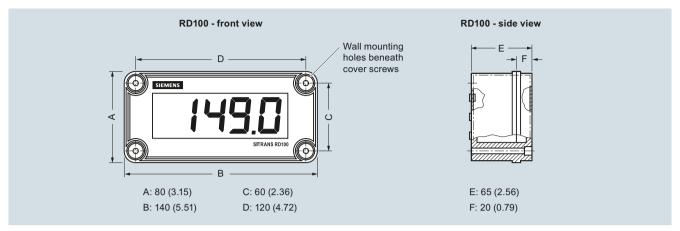
- Available ex stock. For details see page 9/5 in the appendix.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Operating Instructions English French German Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	7ML1998-5JU01 7ML1998-5JU11 7ML1998-5JU31
Accessories Panel mount kit 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	7ML1930-1BN 7ML1930-1BP 7ML1930-1BQ

Displays

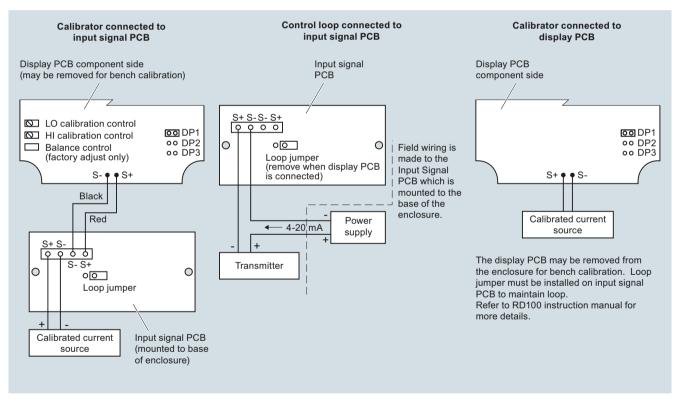
**SITRANS RD100** 

#### Dimensional drawings



SITRANS RD100, dimensions in mm (inch)

#### Schematics



SITRANS RD100 connections

Displays

#### **SITRANS RD200**

#### Overview



The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

#### Benefits

- · Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple and RTD signals
- Single or dual 24 V DC transmitter power supply
- Analog to Modbus RTU conversion as standard feature
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost or errors
- RD software supporting remote configuration, monitoring and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, supports pump alternation control, and optional NEMA 4 and 4X FIELD ENCLOSURES
- · Large display option for improved visibility at greater distances

#### Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments.

Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments

The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

#### **Key Applications**

Tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring and data logging with RD software.

#### Technical specifications Mode of operation Measuring principle Analog to digital conversion Measuring points 1 instrument · Remote monitoring of 100 instruments with PC and RD software Input Measuring range Current • 4 ... 20 mA, 0 ... 20 mA Voltage • 0 ... 10 V DC, 1 ... 5 V, 0 ... 5 V • Type J: -50 ... +750 °C (-58 ... +1 382 °F) • Thermocouple temperature • Type K: -50 ... +1 260 °C (-58 ... +2 300 °F) • Type E: -50 ... +870 °C (-58 ... +1 578 °F) • Type T: -180 ... +371 °C (-292 ... +700 °F) • Type T, 0.1 resolution: -180.0 ... +371 °C (-199.9 ... +700 °F) • 100 Ω RTD: -200 ... +750 °C • RTD temperature (-328 ... +1 382 °F) **Output signal** Output • PDC output • 4 ... 20 mA (optional) • Modbus RTU

Relays 2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)

Communications • RS 232 with PDC or Modbus RTU • RS 422/485 with PDC or

#### Accuracy

4 ... 20 mA optional output  $\pm$  0.1 % FS  $\pm$  0.004 mA  $\pm\,0.05$  % of span  $\pm\,1$  count, square root: 10 ... 100 % FS Process input • Type J: ± 1 °C (± 2 °F) Thermocouple temperature input

> • Type E: ± 1 °C (± 2 °F) • Type T: ± 1 °C (± 2 °F) • Type T, 0.1 Resolution: ± 1 °C (± 1.8 °F)

• Type K: ± 1 °C (± 2 °F)

Modbus RTU

• 100 Ω RTD: ± 1 °C (± 1 °F) RTD temperature input

#### Rated operating conditions

Ambient conditions Storage temperature range Operating temperature range

-40 ... +85 °C (-40 ... +185 °F) 0 ... 65 °C (32 ... 149 °F)

#### Design

Weight Material (enclosure) 269 g (9.5 oz) (including options)

• 1/8 DIN, high impact plastic, UL94V-0, color: gray • Optional plastic, steel and stain-

less steel (Type 304, EN 1.4301) NEMA 4 enclosures

Type 4X, NEMA 4X, IP65 (front Degree of protection cover); panel gasket provided

# Supplementary Components Displays

SITRANS RD200

Electrical connection		
• mA output signal	2-core copper conductor, twiste shielded, 0.82 3.30 mm <sup>2</sup> (18 12 AWG), Belden 8 760 of equivalent is acceptable	
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC	
Power supply		
Input voltage option 1	85 265 V AC, 50/60 Hz; 90 265 V DC, 20 W max.	
Input voltage option 2	12 36 V DC; 12 24 V AC, 6 W max.	
Transmitter power supply	One or two isolated transmitter power supplies (optional)	
• Single power supply	One 24 V DC $\pm$ 10 % at 200 mA max.	
Dual power supplies	Two 24 V DC $\pm$ 10 % at 200 mA and 40 mA max.	
External loop power supply	35 V DC max.	
Output loop resistance	<ul> <li>24 V DC, 10 700 Ω max.</li> <li>35 V DC (external), 100 1 200 Ω max.</li> </ul>	
Displays and controls		
Display	<ul> <li>14 mm (0.56 inch) high LED</li> <li>2X option for 30.5 mm (1.2 inch) high, red LED</li> <li>Numeric range from         <ul> <li>1 999 +9 999</li> </ul> </li> <li>4 digits, automatic lead zero blanking</li> <li>8 intensity levels</li> </ul>	
Memory	Non-volatile	
•	<ul> <li>Stores settings for minimum of 10 years if power is lost</li> </ul>	
Programming	Primary: front panel     Secondary: meter copy or PC with SITRANS RD software	
Certificates and approvals	CE, UL, <sub>C</sub> UL	
Options		
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures	
Mounting	• 2 inch (5.08 cm) pipe mounting kit (zinc plated seal)	
	• 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	

Displays

#### **SITRANS RD200**

Selection and Ordering data		Ar	ticl	e١	Vo.	
SITRANS RD200		7N	IL5	74	0-	
A universal input, panel mount remote digital display for process instrumentation.	-	r	۱	1	-	A
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Input voltage 85 265 V AC, 50/60 Hz; 90 265 V DC,	<b>&gt;</b>	1				
20 W max. 12 36 V DC; 12 24 V AC, 6 W max.	•	2				
Transmitter supply						
None		1	١			
Single 24 V DC transmitter supply <sup>1)</sup>	<b>&gt;</b>	E	3			
Dual 24 V DC transmitter supply <sup>1)2)</sup>		(				
Output						
None	<b>&gt;</b>		Α			
2 relays			В			
4 20 mA output			С			
Communication						
Modbus enabled	▶•			0		
Approvals						
CE, UL, <sub>C</sub> UL	•			1	ı	
Display Size						
Standard	<b>&gt;</b>					0
2X option for 30.5 mm (1.2 inch) high, red LED	<b>&gt;</b>					1

- 1) Available with input voltage option 1 only
- 2) Available with output option C only
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.
- Available ex stock when configured with the following options only: Input voltage: 1, Transmitter supply: B, Output: A, Communication: 0. For details see page 9/5 in the appendix.

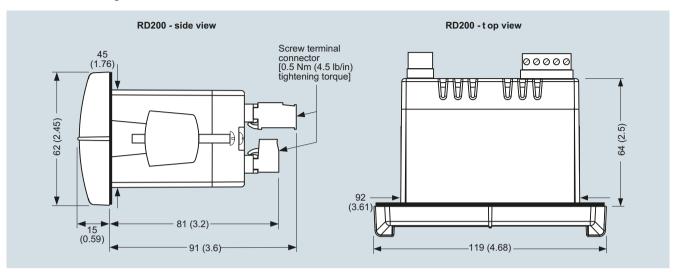
Selection and Ordering data	Article No.
Operating Instructions	
English	7ML1998-5JS01
Spanish	7ML1998-5JS21
German Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	7ML1998-5JS31
Other Operating Instructions	
SITRANS RD Enclosures, English	7ML1998-5JX01
SITRANS RD Enclosures, German	7ML1998-5JX31
SITRANS RD Serial communications accessories, English	A5E31979195
SITRANS RD Serial communications accessories, German	A5E31979197
SITRANS RD Software, English	7ML1998-5JW01
SITRANS RD Software, German	7ML1998-5JW31

Selection and Ordering data	Article No.
Accessories	
SITRANS RD200 copy cable 2.1 m (7 ft)	7ML1930-1BR
SITRANS RD200 RS 232 serial adapter (copy cable included)	7ML1930-1BS
SITRANS RD200 RS 422/485 serial adapter (copy cable included)	7ML1930-1BT
RS 232 to RS 422/485 isolated converter	7ML1930-1BU
RS 232 to RS 422/485 non-isolated converter	7ML1930-1BV
SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter board	7ML1930-1BW
USB to RS 422/485 isolated converter	7ML1930-1BX
USB to RS 422/485 non-isolated converter	7ML1930-1BY
USB to RS 232 converter	7ML1930-6AK
RD Software CD for 1 100 displays	7ML1930-1CC
Low cost polycarbonate plastic enclosure for 1 display	7ML1930-1CF
2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML1930-1CF	7ML1930-1BP
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML1930-1CF	7ML1930-1BQ
Thermoplastic enclosure	
For use with 1 display	7ML1930-1CG
For use with 2 displays	7ML1930-1CH
For use with 3 displays	7ML1930-1CJ
For use with 4 displays	7ML1930-1CK
For use with 5 displays	7ML1930-1CL
For use with 6 displays	7ML1930-1CM
Stainless steel enclosure (Type 304, EN 1.4301)	
For use with 1 display	7ML1930-1CN
For use with 2 displays	7ML1930-1CP
For use with 3 displays	7ML1930-1CQ
For use with 4 displays	7ML1930-1CR
For use with 5 displays	7ML1930-1CS
For use with 6 displays	7ML1930-1CT
Steel enclosure	
For use with 1 display	7ML1930-1CU
For use with 2 displays	7ML1930-1CV
For use with 3 displays	7ML1930-1CW
For use with 4 displays	7ML1930-1CX
For use with 5 displays	7ML1930-1CY
For use with 6 displays	7ML1930-1DA

Displays

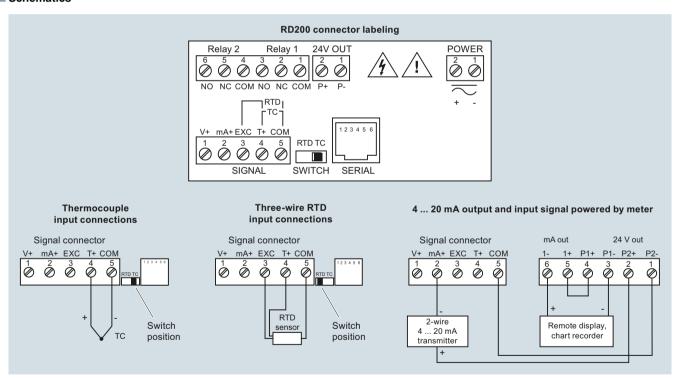
**SITRANS RD200** 

#### Dimensional drawings



SITRANS RD200, dimensions in mm (inch)

#### Schematics



SITRANS RD200 connections

Displays

#### **SITRANS RD300**

#### Overview



The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

#### Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- · Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line 6-digit display
- · Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

#### Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free downloadable RD software.

The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

#### **Key Applications**

Tank farms, pump alternation control, local or remote display of level, flow, pressure and weighing instrument values, PC monitoring and data logging with RD software.

#### Technical specifications

Analog to digital conversion
1 or 2 instruments
• 4 20 mA, 0 20 mA
• 0 10 V DC, 1 5 V, 0 5 V
, ,
<ul><li>4 20 mA (optional)</li><li>Modbus RTU</li></ul>
2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional)
• RS 232 with Modbus RTU • RS 422/485 with Modbus RTU
$\pm$ 0.1 % FS $\pm$ 0.004 mA
± 0.05 % of span ± 1 count, square root: 10 100 % FS
-40 +85 °C (-40 +185 °F)
0 65 °C (32 149 °F)
269 g (9.5 oz) (including options)
<ul> <li>1/8 DIN, high impact plastic, UL94V-0, color: gray</li> </ul>
<ul> <li>Optional plastic, steel and stain- less steel (Type 304, EN 1.4301) NEMA 4 enclosures</li> </ul>
Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided
2-core copper conductor, twisted, shielded, 0.82 3.30 mm <sup>2</sup> (18 12 AWG), Belden 8 760 or equivalent is acceptable
Copper conductor according to local requirements, rated 3 A at 250 V AC
85 265 V AC, 50/60 Hz; 90 265 V DC, 20 W max. or jumper selectable 12/24 V DC ± 10 %, 15 W max.
Terminals P+ & P-: 24 V DC ± 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 265 V AC models rated at 200 mA max, 12/24 V DC pow- ered models rated at 100 mA max, at 50 mA max. for 5 or 10 V DC supply.
35 V DC max.
<ul> <li>24 V DC, 10 700 Ω max.</li> <li>35 V DC (external), 100 1 200 Ω max.</li> </ul>

. Displays

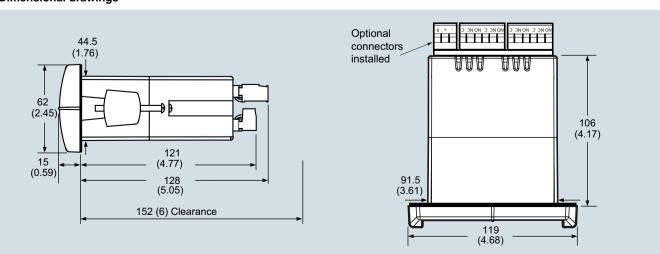
#### SITRANS RD300

Displays and controls		
Main Display	0.6 inch (15 mm) high, red LEDs	
Second display	0.46 inch (12 mm) high, red LEDs, 6-digits: each (-99 999 999 999)	
Memory	Non-volatile	
	<ul> <li>Stores settings for minimum of 10 years if power is lost</li> </ul>	
Programming	Primary: front panel	
	<ul> <li>Secondary: meter copy or PC with SITRANS RD software</li> </ul>	
Certificates and approvals	CE, UL, <sub>C</sub> UL	
Options		
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures	

Selection and Ordering data	Article No.
SITRANS RD300  Dual line Remote digital display compatible with PI instruments  ✓ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5744-
Input voltage 85 265 V AC, 50/60 Hz; 90 265 V DC, 20 W max. 12 36 V DC; 12 24 V AC, 6 W max.	1 2
Output None 2 Relays 4 Relays 4 20 mA output 2 Relays and 4 20 mA output 4 Relays and 4 20 mA output	A B C D E
Type Single input process and flow rate/totalizer Mtr Dual input process Mtr	A B
<b>Display</b> Standard SunBright	0
Approvals UL & C-UL & CE	0

Selection and Ordering data Operating Instructions Single input process and flow rate/totalizer Mtr English French A5E31948924 German A5E31948919  Dual input process Mtr English A5E33481367 German A5E33481367 German Note: The operating instructions should be ordered as a separate line on the order. Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German A5E31979195 SITRANS RD Serial Communications Accessories, German A5E31979195 SITRANS RD Serial Communications Accessories, German ACCESSORIES DIN-Rail Mounting Kit A Relays Expansion Module A Digital I/O Module Dual output 4 20 mA expansion module for dual input meter Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter FR 422/485 Serial Adapter FR 422/485 Serial Adapter FR 5232 Converter FR 7ML1930-6AL Plastic enclosure For 1 meter For 2 meters For 1 meter For 2 meters For 5 meters For 6 meters For 6 meters For 6 meters For 6 meters		
Single input process and flow rate/totalizer Mtr English French German A5E31948919  Dual input process Mtr English German Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German A5E31979195 SITRANS RD Serial Communications Accessories, German Accessories DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter Meter Copy Cable RS 232 Serial Adapter Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 420 Serial Adapter RS 42185 Converter Snubber Plastic enclosure For 1 meter For 1 meter For 2 meters For 2 meters For 4 meters For 5 meters  7ML1930-6AN 7ML1930-6AN 7ML1930-6AN 7ML1930-1CL	Selection and Ordering data	Article No.
English French German Dual input process Mtr English Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German A5E31979176 A5E31979178 A5E31979176 A5E31979195 A5E31979195 A5E31979195 A5E31979195 A5E31979197 A5E31979198 A5E31979181 A5E3197918 A5E31979181 A5E3	Operating Instructions	
French German Dual input process Mtr English German Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter RS 422/485 Serial Adapter RS 422/485 Converter Snubber Plastic enclosure For 1 meter For 2 meters For 2 meters For 4 meters For 4 meters For 5 meters  A5E31979181 A5E31979181 A5E31979181 A5E31979173 A5E31979173 A5E31979173 A5E31979176 A5E31979175 A5E31979195 A5E31979197 A5E31979195 A5E31979181 A5E3197918 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319	Single input process and flow rate/totalizer Mtr	
German Dual input process Mtr English German Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable RS 232 Serial Adapter RS 422/485 Converter Snubber Plastic enclosure For 1 meter For 2 meters For 2 meters For 4 meters For 2 meters For 4 meters For 5 meters  A5E31979181 A5E319711 A5E31979181 A5E3197181 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E319718 A5E	English	A5E31917845
Dual input process Mtr English German Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter Meter Copy Cable RS 232 Serial Adapter Meter Copy Cable RS 422/485 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter USB to RS 232 Converter Snubber Plastic enclosure For 1 meter For 2 meters For 2 meters For 4 meters For 5 meters  TML1930-6AN TML1930-1CL TML1930-1CL	French	A5E31948924
English German Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German Accessories DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter Meter Copy Cable RS 232 Serial Adapter Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter USB to RS 232 Converter Snubber Plastic enclosure For 1 meter For 2 meters For 4 meters For 4 meters For 5 meters For 5 meters  A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979181 A5E31979184 A5E31979181 A5E31979184 A5E31979181 A5E31979181 A5E31979181 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979181 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979184 A5E31979181 A5E31979184 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E3197916 A5E319	German	A5E31948919
Rerman Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter For 1 meter For 1 meter For 2 meters For 4 meters For 4 meters For 5 meters  A5E31979181 A5E31979184 A5E3197918 A5E3197916 A5E3197916 A5E3197916 A5E31979173 A5E31979	Dual input process Mtr	
Note: The operating instructions should be ordered as a separate line on the order.  Other Operating Instructions  SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German A5E31979184  SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable RS 232 Serial Adapter Meter Copy Cable RS 422/485 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter TML1930-6AF RS 421 Converter TML1930-6AK Snubber For 1 meter  For 1 meter  For 2 meters TML1930-6AN TML1930-1CK	English	A5E33481367
as a separate line on the order.  Other Operating Instructions  SITRANS RD DIN-Rail Mounting Kit, English SITRANS RD DIN-Rail Mounting Kit, German A5E31979184  SITRANS RD Expansion Modules, English SITRANS RD Expansion Modules, German SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, English SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter RD300 USB Serial Adapter VML1930-6AF RS 422/485 Converter Snubber For 1 meter For 2 meters  TML1930-6AN For 2 meters  TML1930-6AN For 4 meters  TML1930-1CK TML1930-1CK	German	A5E33481387
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SITRANS RD Serial Communications Accessories, English  SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit  4 Relays Expansion Module  4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  VSB to RS 232 Converter  Snubber  For 1 meter  For 2 meters  For 4 meters  For 4 meters  For 5 meters  A5E31979195  A5E31979195  A5E31979195  A5E31979195  A5E31979195  A5E31979197  A5E31979195  A5E31979195  A5E31979197  A5E31979195  A5E31979197  A5E31979197  A5E31979197  A5E31979197  A5E31979197  A5E31979197  A5E31979197  A5E31979197  A5E31979197  ASE31979197  ASE31	SITRANS RD Expansion Modules, English	A5E31979173
English  SITRANS RD Serial Communications Accessories, German  Accessories  DIN-Rail Mounting Kit  4 Relays Expansion Module  4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RS 422/485 Serial Adapter  Was to RS 232 Converter  Snubber  Plastic enclosure  For 1 meter  For 2 meters  For 4 meters  For 4 meters  For 5 meters  A5E31979197  AML1930-6AB  A5E31979197  ABL1930-6AB  A5E31979197  ABL1930-6AB  A5E31979197  ABL1930-6AB  A5E31979197  ABL1930-6AB  A5E31979197  ABL1930-6AB  AFE31979197  ABL1930-1CK  AML1930-1CK  AML1930-1CK  AML1930-1CL	SITRANS RD Expansion Modules, German	A5E31979176
German  Accessories  DIN-Rail Mounting Kit  4 Relays Expansion Module  7 ML1930-6AB  4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  White of the serial Adapter  Thus of the serial		A5E31979195
DIN-Rail Mounting Kit  4 Relays Expansion Module  7 ML1930-6AC  4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  WBs to RS 232 Converter  Thus 1930-6AF  Thus 1930-6AG  Thus 1930-6AG  Thus 1930-6AG  Thus 1930-6AG  Thus 1930-6AG  Thus 1930-6AG  Thus 1930-6AC  Thus 1930-1CC  Thus 1930-1CC		A5E31979197
4 Relays Expansion Module  4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  WB to RS 232 Converter  Snubber  Plastic enclosure  For 1 meter  For 4 meters  TML1930-6AC  7ML1930-6AN  7ML1930-6AN  7ML1930-6AN  7ML1930-6AN  7ML1930-6AN  7ML1930-6AN  7ML1930-6AN  7ML1930-1CK  7ML1930-1CK	Accessories	
4 Digital I/O Module  Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  WSB to RS 232 Converter  TML1930-6AF  TML1930-6AJ  TML1930-6AJ  TML1930-6AL  TML1930-6AL  TML1930-6AK  TML1930-6AL  TML1930-6AL  TML1930-6AL  TML1930-6AL  TML1930-6AL  TML1930-6AN  TML1930-6AN  TML1930-6AN  TML1930-1CK  TML1930-1CL	DIN-Rail Mounting Kit	7ML1930-6AB
Dual output 4 20 mA expansion module for dual input meter  Meter Copy Cable  RS 232 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  USB to RS 232 Converter  TML1930-6AK  Snubber  For 1 meter  For 2 meters  For 4 meters  For 5 meters  TML1930-1CL  TML1930-6AP  TML1930-6AP  TML1930-6AB  TML1930-6AB  TML1930-6AM  TML1930-6AN  TML1930-1CK  TML1930-1CL	4 Relays Expansion Module	7ML1930-6AC
input meter         Meter Copy Cable       7ML1930-6AE         RS 232 Serial Adapter       7ML1930-6AF         RS 422/485 Serial Adapter       7ML1930-6AG         RD300 USB Serial Adapter       7ML1930-6AJ         USB to RS 232 Converter       7ML1930-6AK         Snubber       7ML1930-6AL         Plastic enclosure       7ML1930-6AM         For 1 meter       7ML1930-6AN         For 2 meters       7ML1930-1CK         For 5 meters       7ML1930-1CL	4 Digital I/O Module	7ML1930-6AD
RS 232 Serial Adapter  RS 422/485 Serial Adapter  RD300 USB Serial Adapter  TML1930-6AG  RD300 USB Serial Adapter  TML1930-6AJ  USB to RS 232 Converter  TML1930-6AK  Snubber  TML1930-6AL  Plastic enclosure  For 1 meter  TML1930-6AM  For 2 meters  TML1930-6AN  For 4 meters  TML1930-1CK  TML1930-1CL	· · · · · · · · · · · · · · · · · · ·	7ML1930-6AP
RS 422/485 Serial Adapter       7ML1930-6AG         RD300 USB Serial Adapter       7ML1930-6AJ         USB to RS 232 Converter       7ML1930-6AK         Snubber       7ML1930-6AL         Plastic enclosure         For 1 meter       7ML1930-6AM         For 2 meters       7ML1930-6AN         For 4 meters       7ML1930-1CK         For 5 meters       7ML1930-1CL	Meter Copy Cable	7ML1930-6AE
RD300 USB Serial Adapter       7ML1930-6AJ         USB to RS 232 Converter       7ML1930-6AK         Snubber       7ML1930-6AL         Plastic enclosure       7ML1930-6AM         For 1 meter       7ML1930-6AM         For 2 meters       7ML1930-1CK         For 5 meters       7ML1930-1CL	RS 232 Serial Adapter	7ML1930-6AF
USB to RS 232 Converter       7ML1930-6AK         Snubber       7ML1930-6AL         Plastic enclosure       For 1 meter       7ML1930-6AM         For 2 meters       7ML1930-1CK         For 5 meters       7ML1930-1CL	RS 422/485 Serial Adapter	7ML1930-6AG
Snubber         7ML1930-6AL           Plastic enclosure         7ML1930-6AM           For 1 meter         7ML1930-6AM           For 2 meters         7ML1930-1CK           For 5 meters         7ML1930-1CL	RD300 USB Serial Adapter	7ML1930-6AJ
Plastic enclosure           For 1 meter         7ML1930-6AM           For 2 meters         7ML1930-6AN           For 4 meters         7ML1930-1CK           For 5 meters         7ML1930-1CL	USB to RS 232 Converter	7ML1930-6AK
For 1 meter         7ML1930-6AM           For 2 meters         7ML1930-6AN           For 4 meters         7ML1930-1CK           For 5 meters         7ML1930-1CL	Snubber	7ML1930-6AL
For 2 meters 7ML1930-6AN For 4 meters 7ML1930-1CK For 5 meters 7ML1930-1CL	Plastic enclosure	
For 4 meters         7ML1930-1CK           For 5 meters         7ML1930-1CL	For 1 meter	7ML1930-6AM
For 5 meters 7ML1930-1CL	For 2 meters	7ML1930-6AN
	For 4 meters	7ML1930-1CK
For 6 meters 7ML1930-1CM	For 5 meters	7ML1930-1CL
	For 6 meters	7ML1930-1CM

#### Dimensional drawings



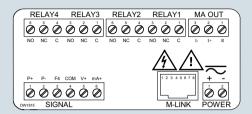
SITRANS RD300, dimensions in mm (inch)

Displays

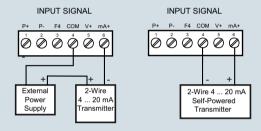
#### **SITRANS RD300**

#### Schematics

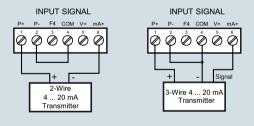
Connector labeling for fully loaded single input meter



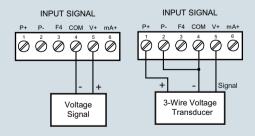
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply



Voltage Input Connections



SITRANS RD300 connections

Remote data manager

**SITRANS RD500** 

#### Overview



The SITRANS RD500 is a remote data manager providing remote monitoring through integrated web access, alarm event handling, and data capture for instrumentation and other devices.

#### Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web provides worldwide access to instrument data and RD500 configuration and setup
- Simple configuration using a standard web browser, no programming or additional software required
- Offers scalability with optional I/O modules for current (4 to 20 mA), voltage (0 to 10 V), thermocouple (TC), resistance temperature detector (RTD), and digital input, output and counter
- 10 base-TI 100 Base-TX Ethernet and support for GSM, GPRS, 3G, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and supports addressing for Modbus serial devices via RS 232 and RS 485 serial ports
- Integrated FTP server and client supports FTP data synchronization to central servers
- Compact flash slot supports up to 2 gigabytes of expandable memory for data capture and storage, 1 gigabyte industrial compact flash card included
- Log files formats are CSV (comma separated values) for data files and HTML for report files
- Supports Modbus TCP via Ethernet and GPRS for easy integration into control systems
- Optional 3G modem offers VPN support

#### Application

The RD500 is an easy-to-use remote data monitoring solution, using a web-based application and hardware modules. The unique modular approach allows a variety of process signals to be monitored, while the serial ports allow data to be collected from Modbus RTU devices.

The RD500 comprises a master communications module, and up to 16 slave modules. Various module types are available, allowing up to a maximum of 128 conventional inputs and outputs. The RD500's serial ports can support addressing for Modbus RTU slave devices including field instruments.

The RD500's built-in web server, FTP, and email client allows the process to be monitored remotely. Alarm notifications are communicated through email and SMS text messages to one or more

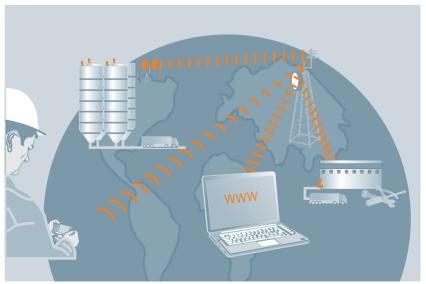
recipients to ensure that appropriate actions are taken by personnel.

The RD500 supports modems, providing flexibility for applications in which GSM/GPRS/3G cellular or landline connectivity is desired.

The RD500 is configured via a web-based interface - a standard browser is all the software you need to configure your system.

#### **Key Applications**

Remote monitoring, inventory management, web enabled instrumentation or other devices remote configuration and maintenance devices



With SITRANS RD500, monitor inventory levels, process, environmental, and remote maintenance applications, and get web access to most types of field instrumentation, including flow, level, pressure, temperature measurement, and weighing.

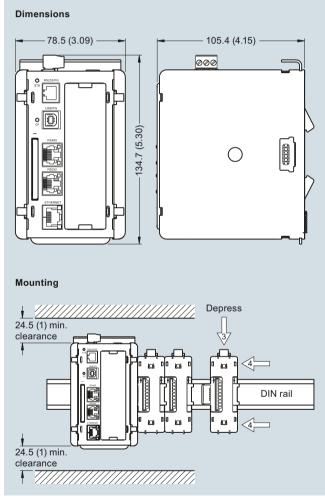
Remote data manager

#### **SITRANS RD500**

Technical specifications	
Mode of operation	
Measuring principle	Remote data monitor
Measuring points	<ul> <li>Up to 128 standard input/ outputs</li> </ul>
	<ul> <li>Addressing for Modbus serial devices</li> </ul>
Input	See table on page 7/21
Output	See table on page 7/21
Accuracy	See table on page 7/21
Rated operating conditions	
Storage temperature range	-30 +70 °C (-22 +158 °F)
Operating temperature	0 50 °C (32 122 °F)
Operating and storage humidity	80 % max relative humidity, non-condensing, from 0 50 °C (32 122 °F)
Design	
Material (enclosure)	High impact plastic and stainless steel
Installation category	1
Pollution degree	2
Weight	456.4 g (15.1 oz)
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 - 35 x 7.5 and - 35 x 15
Power	24 V DC ± 10 %
	400 mA min. (1 module)
	3.5 Amps max. (16 modules)
	Must use Class 2 or SELV-rated power supply
Display	
Status LEDs	<ul> <li>STS - status LED indicates condition of master</li> </ul>
	TX/RX - transmit/receive LEDs show serial activity
	Ethernet - link and activity LEDs
	<ul> <li>CF - CompactFlash LED indi- cates card status and read/write activity</li> </ul>
Memory	
On-board user memory	4 Mbytes of non-volatile Flash memory
On-board SDRAM	2 Mbytes
Memory card	CompactFlash Type II slot for Type I and Type II cards; 1 Gbytes (optional 2 Gbytes)
Certificates and approvals	
Safety	UL listed to U.S. and Canadian safety standards for use in Class I, II and III, Division 1 and 2 hazardous locations     CE, RCM

# Communication USB/PG port Adheres to USB specifications 1.1. Device only using Type B connection. Serial ports Format and baud rates for each port are individually software programmable up to 115 200 baud RS 232/PG port RS 232 port via RJ12 Comms ports RS 422/485 port via RJ45 and RS 232 port via RJ 12 Ethernet port 10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

#### Dimensional drawings



SITRANS RD500, dimensions in mm (inch)

Remote data manager

SITRANS RD500

#### SITRANS RD500 Module Specifications

	8 inputs, 6 solid state outputs	8 inputs, 6 relay outputs	8 channel, 4 20 mA	8 channel ± 10 V	6 channel, RTD	8 channel thermo- couple module
Article number	7ML1930-1ES	7ML1930-1ER	7ML1930-1EP	7ML1930-1EQ	7ML1930-1ET	7ML1930-1EU
Application	8 inputs, 6 outputs used to monitor contact or sensor inputs	8 inputs, 6 outputs used to monitor contact or sensor inputs	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4 20 mA process signals	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals	16 bit analog input module provides high-density signal measurement for data acquisition applications and accepts various RTD inputs	16 bit thermocouple input module provides high density signal measure ment for data acquisition applications and accepts wide range of thermocouple types
Accuracy	Not applicable	Not applicable	± 0.1 % of span	± 0.1 % of span	± (0.2 % of span, 1 °C) 0 50 °C (32 122 °F); ± (0.1 % of span, 1 °C) 18 28 °C (64 82 °F); includes NIST con- formity, A/D conver- sion errors, temperature coeffi- cient and lineariza- tion conformity at 23 °C after 20 minutes warm- up	± (0.3 % of span, 1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and lin- earization confor- mity at 23 °C after 20 minute warm-up
Mounting	Snaps onto standar	d DIN style top hat (T)	) profile mounting rail:	s according to EN 50	022 – 35 x 7.5 and - 3	5 x 15
Inputs	Dip switch select- able for sink or source	Dip switch selectable for sink or source  Max. voltage • 30 V DC, reverse polarity protected  Off voltage • < 1.2 V  On voltage • > 3.8 V  Input frequency • Filter switch on: 50 Hz • Filter switch off: 300 Hz	8 single-ended Ranges  • 0 20 mA or  4 20 mA Resolution  • full 16-bit Sample time  • 50 400 ms depending on number of en- abled inputs	8 single-ended Ranges  • 0 10 V DC or ± 10 V DC Resolution  • full 16-bit Sample time  • 50 400 ms depending on number of en- abled inputs	6 single-ended Resolution • full 16-bit Sample time • 67 400 ms depending on number of en- abled inputs	8 single-ended Resolution • full 16-bit Sample time • 50 400 ms depending on number of en- abled inputs
Outputs	Solid state output, switched DC, con- tact rating 1 A DC max.	Form A, NO pairs share common terminals: 1 & 2, 3 & 4, 5 & 6 current rating by pair: 3 Amps at 30 V DC/125 V AC resistive 1/10 HP at 125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

#### Note:

To ensure the secure operation of a plant or machine it is necessary to take additional, suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Please find further information at: <a href="http://www.siemens.com/industrialsecurity">http://www.siemens.com/industrialsecurity</a>

Remote data manager

#### **SITRANS RD500**

Selection and Ordering data	А	rti	cle No.
SITRANS RD500	7	MI	L5750-
The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.	ľ		A 0 0 - 0
Communications Connection Ethernet <sup>1)</sup>	1		
<b>Digital Communications to Instruments</b> RS 485 Modbus RTU		A	

- 1) Configuration limited to 16 modules.
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Input configuration modules	
Note: one RD500 supports 16 input modules maximum	
RD500 8 channel 0 (4) 20 mA input module	7ML1930-1EP
RD500 8 channel ± 10 V input module	7ML1930-1EQ
RD500 8 digital inputs/pulse counters, 6 relay outputs module	7ML1930-1ER
RD500 8 digital inputs/pulse counters, 6 solid state outputs module <sup>1)</sup>	7ML1930-1ES
RD500 6 channel input, RTD module	7ML1930-1ET
RD500 8 channel thermocouple module	7ML1930-1EU
Optional equipment	
External Cellular modem	7ML1930-1GJ
Multitech GPRS modem, internal (including antennae)	7ML1930-1EY
Industrial CompactFlash card, 2 GB	7ML1930-1FB
Industrial CompactFlash card, 1 GB	7ML1930-1FC
RJ11 serial to terminal block RS 232	7ML1930-1FD
RJ45 serial to terminal block RS 485	7ML1930-1FE
GPRS Spare modem antenna	7ML1930-1FF
RD500 Spare Module base	7ML1930-1FG
RD500 Spare End terminator	7ML1930-1FH
Ethernet Cat 5e Red X/O cable for configuration, 1.52 m (5 ft)	7ML1930-1FM
USB cable type A/B	7ML1930-1FN
Remote mount external antenna 17 ft (5 m)	7ML1930-1FY
Operating Instructions	
Application manual, English	7ML1998-5MA01
Application manual, German	7ML1998-5MA31
Note: Additional Operating Instructions should be ordered as a separate line item.  This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	

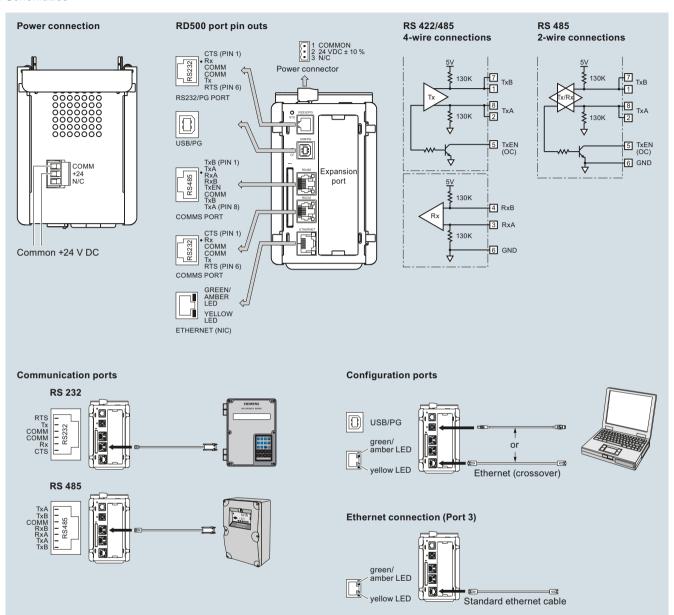
Selection and Ordering data	Article No.
Other Operating Instructions	
RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture	7ML1998-5MK01
RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture	7ML1998-5MK31
RD500 8 channel 0 (4) 20 mA input module manual, English	7ML1998-5MB01
RD500 8 channel 0 (4) 20 mA input module manual, German	7ML1998-5MB31
RD500 8 channel ± 10 V input module manual, English	7ML1998-5MC01
RD500 8 channel ± 10 V input module manual, German	7ML1998-5MC31
RD500 8 inputs, 6 relay outputs module manual, English	7ML1998-5MD01
RD500 8 inputs, 6 relay outputs module manual, German	7ML1998-5MD31
RD500 8 inputs, 6 solid state outputs module manual, English	7ML1998-5ME01
RD500 8 inputs, 6 solid state outputs module manual, German	7ML1998-5ME31
RD500 6 channel input, RTD module manual, English	7ML1998-5MF01
RD500 6 channel input, RTD module manual, German	7ML1998-5MF31
RD500 8 channel thermocouple module manual, English	7ML1998-5MJ01
RD500 8 channel thermocouple module manual, German	7ML1998-5MJ31
Accessories	
SITRANS RD100, loop powered display - see page 7/10	7ML5741
SITRANS RD200, universal input display with Modbus conversion - see page 7/12	7ML5740
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see page 7/16	7ML5744

- 1) Configuration limited to 16 modules
- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
   For details see page 9/5 in the appendix.

Remote data manager

**SITRANS RD500** 

#### Schematics



SITRANS RD500 connections

WirelessHART products

#### SITRANS AW200 - WirelessHART adapter

#### Overview



SITRANS AW200 WirelessHART adapter

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4 to 20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter

- Support the WirelessHART standard (HART V 7.1)
- Fatures a very high degree of security for wireless data transmission
- Integrates one 4 to 20 mA field device or up to four HART field devices (in multidrop mode) into a WirelessHART network
- Features intelligent energy management for the power supply of connected field devices
- Can be easily parameterized using SIMATIC PDM

#### Benefits

- · High quality and service life
- Save on wiring costs for difficult installation conditions (e.g. moveable equipment parts) or for temporary installations
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms. This application is described in Section 8 of this catalogue under "WirelessHART - Technical Description".
- Proven HART devices can continue to be used for wireless communication, without any limitations.
- Field devices with a 4 to 20 mA interface (without HART) can also be connected.
- Intelligent energy management to achieve the best possible life time for the installed battery unit.
- Optimum addition to wired communication and expansion of solution options for system solutions in process automation.
- Burst mode and event notification parameterization for the adapter and connected field devices.

#### Application

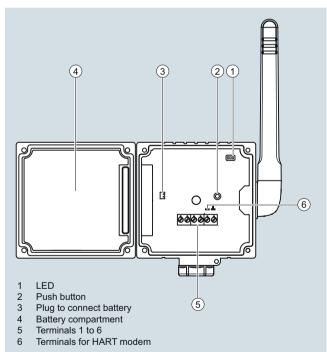
The WirelessHART adapter can be used in a number of different applications, e.g.

- Access to installed basis
   Diagnostic information is obtained from existing wired HART
   devices through a permanent electrical connection of a Wire lessHART adapter, and is sent to an asset management soft ware near the system, e.g. SITRANS MDS.
- Status monitoring of the plant
  Wireless devices are mounted at critical points in the plant,
  which are not usually connected to the control room due to difficult accessibility or extensive costs for wiring. Better data
  flow and diagnostics increase the system's reliability, transparency and safety.
- Process optimization
   A temporary installation of a standard 4 to 20mA or HART device together with the WirelessHART adapter SITRANS AW200 allows flexible monitoring and plant optimization at lower costs and reduced effort.
- Process monitoring
   Measured values from e.g. tanks or silos are transmitted to a
   superordinate system in regular time intervals, together with
   the device and battery status.

#### Design

The SITRANS AW200 WirelessHART adapter consists of

- · A housing with mounted antenna
- Electronics
- A high-performance lithium battery unit



SITRANS AW200 WirelessHART adapter, assembly

The housing can be opened by loosening 4 screws. This allows to access the electronics and battery unit. The battery unit can be removed without the use of tools, since it is connected to the housing with clips.

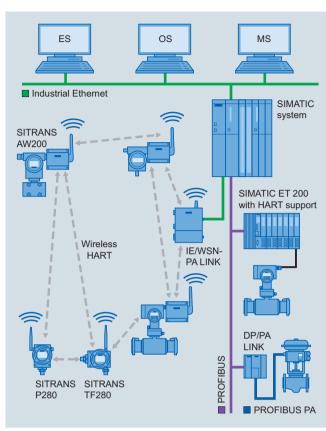
The back of the housing features a connection part with a fixing nut onto which different replaceable connecting pieces can be screwed to mount the adapter directly on a field device.

The bottom of the housing contains an optional cable opening which can be used for a cable gland. In the case of an offset mounted adapter, it is possible to feed up to 2 cables.

WirelessHART products

#### SITRANS AW200 - WirelessHART adapter

#### Function



SITRANS AW200 WirelessHART adapter functional diagram

Measured values and diagnostic information of connected field devices with HART communication are transmitted via a wired connection to the WirelessHART adapter. The adapter transmits this information in the form of wireless signals to the IE/WSN-PA LINK, the Siemens WirelessHART gateway. From here, the information is available to the network of the system.

Where a field device with a 4 to 20 mA output signal is connected to the adapter, only the measured value will be transmitted

Following parameterization and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to the neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organizational purposes are not required.

Two- and four-wire field devices can be connected to a WirelessHART adapter. In the case of a connected two-wire field device, power can be supplied by the adapter. Where multiple twowire field devices are connected (multi drop operation), the adapter must be connected to an external power supply.

The WirelessHART adapter may also be connected in parallel to an already existing installation which consists of a power supply and a HART field device.

Interface	Connection	Function
1		Power supply for the field device
2		HART/4 20 mA
3	<b>──</b>	External supply/Dimensions
4	<b>│ →</b>	High-resistance HART connection
5, 7	<b>│                                    </b>	High-resistance HART connection
6, 8	<b>1</b> — <b>→</b>	Mass, high-resistance connection

Terminal block with 6 screw connection clamps

#### Parameterization

The SITRANS AW200 configured via HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software.

Initial start-up of the adapter is usually carried out via SIMATIC PDM and HART modem or a handheld communicator. During initial start-up, the network ID and join key is set up in the adapter, among others. Using these parameters, the adapter is then integrated into an existing WirelessHART network.

Once it is integrated into the network, the adapter and connected HART devices can be conveniently operated via the WirelessHART network or with the onsite HART modem.

#### Siemens HART field devices for the adapter

HART and 4 to 20mA field devices can be connected to the SITRANS AW200 WirelessHART adapter. Depending on the electrical data of the field devices, they can receive their power supply from the WirelessHART adapter or will require an external power supply. Please find current information about connectivity to field devices from Siemens as FAQ under

http://www.siemens.com/automation/service&support.

#### Note:

Siemens will only approve the Siemens HART field devices listed there for the adapter, and will only supply technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following limitations:

- All warranties and liabilities will be excluded.
- No technical support

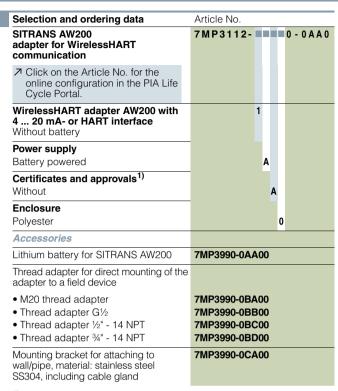
# **Supplementary Components** WirelessHART products

## SITRANS AW200 - WirelessHART adapter

Technical enecifications			
Technical specifications Input		Design	
•	Deint to Deint connection to	•	0.5 km with sut battom 0.75 km
Input	Point-to-Point connection to a HART field device or	Weight	0.5 kg without battery, 0.75 kg with battery
	Point-to-Point connection to a 4 20 mA field device or	Enclosure	
	Up to four HART field devices	<ul><li>Material</li></ul>	Polyester (PBT FR)
	with external power supply which	<ul> <li>Cable entry</li> </ul>	2x M20x1.5
	are integrated using the multidrop method	Degree of protection	IP65, IP66; NEMA 4
Communication	HART communication using multi- drop method, 4 20 mA power	Antenna	Omnidirectional dipolar aerial, vertical rotation
Protocol	signal with Point-to-Point connection  HART V7 (compatible with previ-	Mounting adapter	M20 x 1.5 on M20 x 1.5, M20 x 1.5 on G½, M20 x 1.5 on ½"- 14 NPT, M20 x 1.5 on ¾" -14 NPT
	ous HART versions)		M20 x 1.5 on % -14 NP1
Transfer rate	1200 bits/s using HART multi-	Power supply	
Output	drop method	Battery	Lithium thionylchlorid high-performance battery unit
Communication	WirelessHART V7	Supply voltage	5 7.2 V DC
Transfer rate	Nominal 250 kBits/s	Capacity	19 Ah at 20 °C
Transmission frequency band	2.4 GHz (ISM band)	Service life	Up to 5 years, depending on
Range (under reference conditions)	Outside areas up to 250 m, within buildings up to 50 m	Voltage comply for one field device	update rate, connected field device and ambient conditions
RF signal strength	Can be configured: 0 dBm and 10 dBm	Voltage supply for one field device (independent of multidrop)	9 22 V DC
Output signals		No-load voltage	8 23 V DC
WirelessHART adapter	Measured voltage and up to three	Current	4 20 mA DC (as per NAMUR recommendation NE 43)
	other variables may be selected	Fault current	I ≤ 3.6 mA or I ≥ 21 mA
	from the following: adapter tem- perature, battery voltage, energy consumed, expected battery life	• Protection	Short-circuit proof, activated at voltages > 25 mA
• 4 20 mA field device	time Scaled or linearized process values	External voltage supply for one or more field devices (multidrop)	
HART field device		<ul><li>Voltage</li></ul>	< 30 V DC
• HANT Held device	Up to four process variables, can be configured via PDM or gate- way	Current     Certificates and approvals	< 25 mA
Measuring accuracy (as per reference conditions IEC 61298-2)		Wireless communication approvals	ETSI (R&TTE) FCC Part 15.247 for wireless applications in the 2.4 GHz trans
Max. measuring error (4 20 mA circuit)	0.125 % re: measuring range		mission frequency band EN 300328
Effect of ambient temperature (4 20 mA circuit)	5 μA/10 K		
Rated conditions			
Location	Outside/Inside		
Ambient conditions			
Ambient temperature	-40 +80 °C (-40 +176 °F) The capacity of the battery		
	decreases rapidly if ambient temperature falls below -30 °C.		
Storage temperature	-40 +85 °C (-40 +185 °F) without batteries < 21 °C with batteries		
Relative humidity	Max 90 % at 25 °C (non-condensating)		
Resistance to vibration	$20 \le f \le 2000 \text{ Hz: } 0.01 \text{ g}^2/\text{Hz as}$ per IEC 68-2-64		
<ul> <li>Shock resistance</li> </ul>	15 g, 11 ms as per IEC 68-2-27		
Electromagnetic compatibility	As per EN 61326, EN 301 489-1/17 and NAMUR NE 21		

WirelessHART products

SITRANS AW200 - WirelessHART adapter

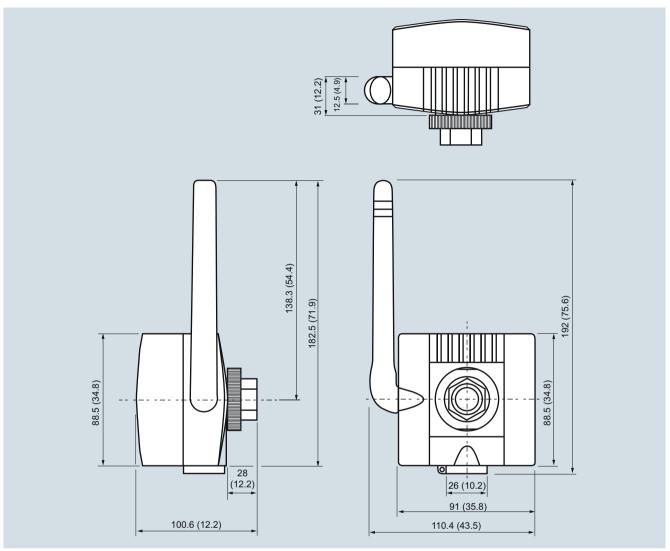


<sup>1)</sup> Additional approvals in process.

WirelessHART products

#### SITRANS AW200 - WirelessHART adapter

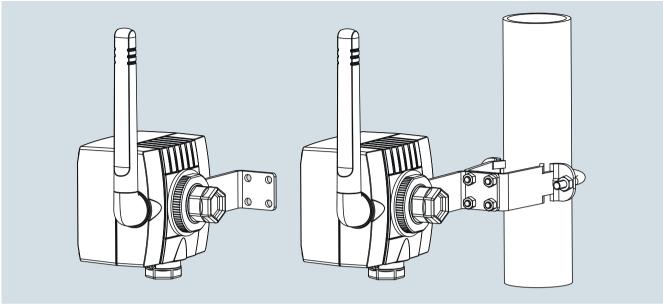
#### Dimensional drawings



SITRANS AW200 WirelessHART adapter, dimensions in mm (inch)

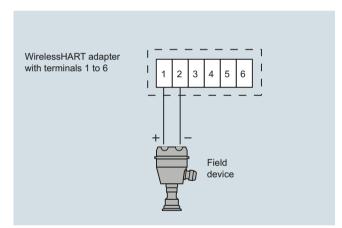
WirelessHART products

SITRANS AW200 - WirelessHART adapter

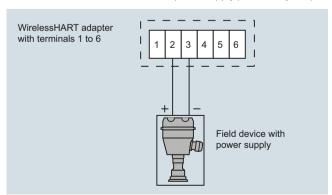


SITRANS AW200 with built-in mounting bracket for wall or pipe mounting

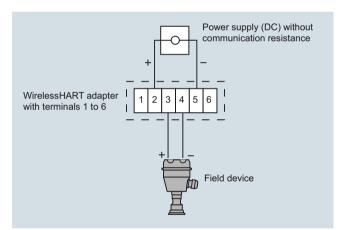
#### Schematics



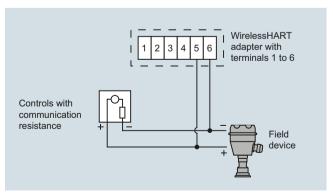
Connection of a two-wire field device, power supply provided by adapter



Connection of a four-wire field device



Connection of a two-wire field device with external power supply



Connection of adapter parallel to wired 4 to 20 mA communication

WirelessHART products

#### SITRANS AW210 - WirelessHART adapter

#### Overview



SITRANS AW210 WirelessHART adapter

The WirelessHART adapter SITRANS AW210 is a communication component which can integrate a wide range of field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The WirelessHART adapter SITRANS AW210

- Supports the WirelessHART standard (HART V 7.1)
- Features an extremely high degree of security for wireless data transmission.
- Integrates a 4 to 20 mA field device into a WirelessHART network
- Integrates up to eight HART field devices (in multidrop mode) into a WirelessHART network
- Can be powered with the 4 to 20 mA loop or an external power supply
- Power management can be activated to minimize energy consumption
- Easy to configure with SIMATIC PDM, AMS, Handheld 475.

#### Benefits

- "Intrinsically safe" or "Explosion proof"
- High quality and service life
- Extremely rugged enclosure
- · No additional cabling required with loop power supply
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms
- Proven HART devices can continue to be used for wireless communication without any limitations
- Field devices with a 4 to 20 mA interface (without HART) can also be connected
- Ideal addition to wired communication and to the range of system solutions in process automation
- Burst mode and event notification configuration for the adapter and connected field devices

#### Application

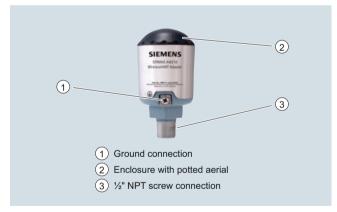
The WirelessHART adapter can be used in a number of different applications:

- Access to installed basis
   Diagnostic information is obtained from existing wired HART devices thanks to the permanent electrical connection of a WirelessHART adapter and power from the 4 to 20 mA loop. This information is sent to central system-based asset management software such as SITRANS MDS.
- Status monitoring of the plant
  Wireless devices are mounted at critical points in the plant
  which are not usually connected to the control room due to difficult access or high wiring costs. Better data flow and diagnostics increase plant reliability, transparency and safety.
- Process optimization
   Temporary installation of a 4 to 20mA or standard HART device together with a SITRANS AW210 WirelessHART adapter allows easier, flexible monitoring and plant optimization at lower costs. SITRANS AW210 can also be usefully used where there is already an external power supply, or one is needed anyway.
- Process monitoring
  Measured values, for example from tanks or silos, are transmitted to a higher-level system at regular intervals together with the device status. SITRANS AW210 is particularly easy to use with 4-wire devices, as they have an external power supply.

#### Design

SITRANS AW210 WirelessHART Adapter consists of:

- · An enclosure with a fitted aerial
- Electronics



SITRANS AW210 Wireless-HART Adapter, assembly

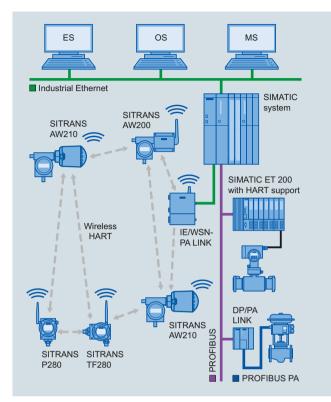
The enclosure contains the potted electronics and the wireless module. The aerial is fitted at the top in the enclosure.

On the base of the enclosure is the connector with a 1/2" NPT female thread. Six cables run from this connector to connect the adapter.

WirelessHART products

#### SITRANS AW210 - WirelessHART adapter

#### Function



SITRANS AW210 WirelessHART Adapter, functional diagram

The measured values and diagnostic information from the connected field devices with HART communication are transmitted to the WirelessHART adapter over wired connections. The adapter transmits this information as wireless signals to the IE/WSN-PA link, the Siemens WirelessHART gateway. The measured values, all parameters and diagnostic information about the plant network can be accessed from this gateway.

If a field device with a 4 to 20 mA output signal is connected to the adapter, the current will be converted to a digital measured value and transmitted on the basis of a measuring range specified in SITRANS AW210.

Following configuration and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to its neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organization are not required.

Two-wire and four-wire field devices can be connected to a Wire-lessHART adapter. Either up to 2 or up to 8 HART field devices can be connected to the adapter, depending on the selected product version. The adapter either has an external voltage supply or is loop-powered. The WirelessHART adapter can therefore also be connected in parallel to an existing installation consisting of a voltage supply and a HART field device.

#### Parameter assignment

SITRANS AW210 is configured via HART. Configuration can be carried out using handheld communicator 475 or, more conveniently, with a HART modem and the SIMATIC PDM configuration software.

Initial startup of the adapter is usually carried out via SIMATIC PDM and a HART modem or a handheld communicator. During initial startup, the network ID and join key are set in the adapter. These parameters are used to integrate the adapter into an existing WirelessHART network.

Following integration into the network, the adapter and HART devices connected can be conveniently operated via the WirelessHART network or locally, as detailed above.

#### Siemens HART field devices for the adapter

In principle, all HART devices certified by the HART Communication Foundation (HCF) can be operated with the SITRANS AW210 WirelessHART adapter. See

http://www.siemens.com/automation/service&support for FAQ with the latest information on connectivity for Siemens field devices.

#### Note:

Siemens has only approved the Siemens HART field devices listed there for the adapter, and will only provide technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following restrictions:

- · All warranties and liability will be excluded
- No technical support

#### Technical specifications

#### Input

Point-to-point connection to a HART field device or Point-to-point connection to a 4 ... 20 mA field device or Up to eight HART field devices with an external voltage supply integrated using multidrop

Communication

- HART communication with multidrop, as primary or secondary HART master (can be specified)
- 4 ... 20 mA current signal with a point-to-point connection scaling in user-defined measuring range in SITRANS AW210
  - Linear
  - User-defined scaling with up to 32 points

HART V7 (compatible with previous HART versions)

Protocol

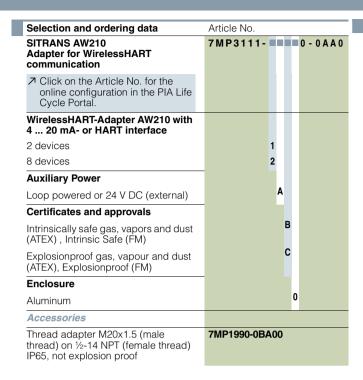
WirelessHART products

#### SITRANS AW210 - WirelessHART adapter

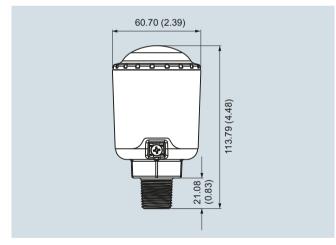
SITRANS AW210 - Wirelessh	iiii aaaptoi		
Output		Certificates and approvals	
Communication	WirelessHART V7	Wireless communication approvals	• CE (R&TTE, EMC)
Transmission frequency band	2.4 2.4835 GHz (ISM band), 16-channel frequency hopping spread spectrum		FCC Part 15.247 for wireless ap- plications in the 2.4 GHz trans- mission frequency band
Range (under reference conditions)	Outside up to 235 m (771 ft)		• IC
RF signal strength	10 dBm	Explosion protection	
Output signals		Intrinsic safe "i" gases and vapors	II 1G Ex ia IIC T*; IP68 T* = T5 for Ta = -40 +85 °C
WirelessHART adapter	HART Cmd 3	vapors	$T^* = T6$ for $Ta = -40 +75$ °C
	Measured current and up to 4 other dynamic variables (measured values, derived values) or	Intrinsic safe dust	II 1 D Ex iaD 20 IP68 T95C; Ta = -40 +85 °C
	device variables  • HART Cmd 9 Up to 8 dynamic variables with	Non-sparking (zone 2)	II 3 G Ex nA nC IIC T* Gc; IP68 T* = T5 for Ta = -40 +85 °C T* = T6 for Ta = -40 +75 °C
	status  • HART Cmd 48	Explosion protection to FM for US Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFG/ T5 Ta = -40 +85 °C,
• 4 20 mA field device	Additional status information		T6 Ta = -40 +75 °C NI/I/2/ABCD/
HART field device	Scaled or linearized process values  HART Cmd 3 Measured current and up to 4 other dynamic variables (measured values, derived values) or device variables HART Cmd 9 Up to 8 dynamic variables with status  HART Cmd 48 Additional status information		This is a second of the control of t
Update time for output signals	You can set the update times separately for the adapter and the connected devices.		I/2/AEx nA nC/IIC/ T5 Ta = -40 +85 °C, T6 Ta = -40 +75 °C; IP68
	The possible settings are:     1, 2, 4, 8, 16, 32 s     1, 2, 5, 10, 30, 60 min (times also depend on the gateway)	Explosion protection to FM for CA Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFG/ T5 Ta = -40 +85 °C T6 Ta = -40 +75 °C; NI/I/2/ABCD/
Measuring accuracy			T5 Ta = -40 +85 °C
Max. measuring error (4 20 mA circuit)	1 % of measuring range, 40 85 °C (104 185 °F)		T6 Ta = -40 +75 °C; S/II,III/2/EFG/ T5 Ta = -40 +85 °C
Rated conditions			T6 Ta = -40 +75 °C;
Location	Outside/inside		I/0/Ex ia/IIC/ T5 Ta = -40 +85 °C
Ambient conditions			T6 Ta = -40 +65 °C;
Ambient temperature	-40 +85 °C (-40 +185 °F) In hazardous areas up to 75 °C (167 °F)		l/2/Ex nA nC/IIC/ T5 Ta = -40 +85 °C T6 Ta = -40 +75 °C
Storage temperature	-40 +85 °C (-40 +185 °F)		II/1/EFG Ta = -40 +85°C; IP68
Electromagnetic compatibility	To EN 301 489-17 and EN 300 328-1	Flameproof gases and vapors	II 2 G Ex d IIC T* Gb; IP68 T* = T5 for Ta = -40 +85 °C T* = T6 for Ta = -40 +75 °C
Design	0.401 (4.04 !! )	Protection by enclosure dust	II 2 D Ex tb IIIC T95°C
Weight	0.46 kg (1.01 lb)	,	$Ta = -40 +85^{\circ}C; IP68$
Enclosure		Explosion protection to FM for US Explosion proof, flameproof, gas,	XP/I/1/ABCD I/1 AEx d IIC T5, T6 Gb
Material		dust	DIP/II,III/1/EFG
- Enclosure	Aluminum alloy, RoHS-compliant polyurethane corrosion-resistant coating		21/AEx tb IIIC T95°C T5 Ta = -40 +85°C, T6 Ta = -40 +75°C
- Cap	Resin	Frankska a transfer	Type 6P, IP68
Cable entry	½" NPT female thread	Explosion protection to FM for CA Explosionproof, flameproof, gas,	XP/I/1/ABCD I/1 Ex d IIC T5, T6 Gb
Degree of protection	IP68	dust	DIP/II,III/1/EFG
Aerial	Potted in enclosure		T5 Ta = -40 +85°C, T6 Ta = -40 +75°C
Auxiliary power			
Power supply	Loop power 1 DC 2.5 V, can be set by user in 0.5 V DC increments		
Loop-powered, operating current	DC 3.2 25 mA operating current; overvoltage, surge and reverse polarity protection		

WirelessHART products

#### SITRANS AW210 - WirelessHART adapter

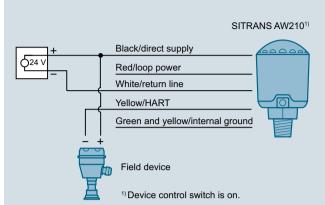


#### Dimensional drawings

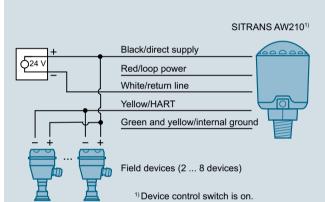


SITRANS AW210 WirelessHART adapter, dimensions in mm (inches)

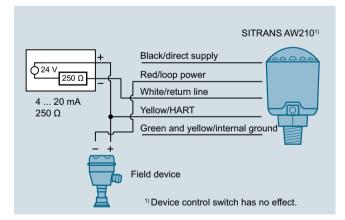
#### Schematics



External 24 V DC power supply, connection of one device



External 24 V DC power supply, connection of multiple devices



Loop power for connection of one 4 ... 20 mA HART device

WirelessHART products

#### IE/WSN-PA LINK

#### Overview



- The IE/WSN-PA LINK is a network transition for the connection of WirelessHART field devices (HART V7.1) to Industrial Ethernet, as an alternative or supplement to the wired connection.
- Connection of up to 100 WirelessHART devices
- Approved for operation in hazardous areas in Zone 2
- Open TCP/IP communication and Modbus TCP via the Ethernet interface
- Can be used with HART-OPC servers of the HART Communication Foundation

A general introduction to WirelessHART and information on the WirelessHART adapter and the WirelessHART field devices can be found in Catalog FI 01 or on the Internet at http://www.siemens.com/wirelesshart

#### Benefits

- Extended possible solutions for connecting process industry field devices by means of alternative or supplementary WirelessHART communication
- Reliable data transmission using intermeshed network technology; the self-organizing network with alternative paths enables radio obstacles to be bypassed
- · Reduction of cabling costs under difficult installation conditions, e.g. if the field devices are located on inaccessible plant components or are only required temporarily
- To improve process monitoring and for maintenance tasks, sensors can be retrofitted
- · Existing transmitters can be integrated wirelessly into maintenance and diagnostics systems by means of WirelessHART adapters
- Without additional software, restricted monitoring is possible via web services and the integrated web server of the IE/WSN-PA LINK.

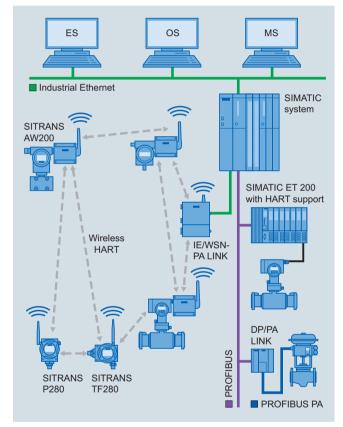
#### Application

The IE/WSN-PA LINK connects wireless HART field devices by radio to the Ethernet. On the radio side, the IE/WSN-PA LINK supports the WirelessHART standard and on the Ethernet side the TCP/IP and Modbus TCP communication.

The IE/WSN-PA LINK thus enables wireless diagnostics, maintenance and process monitoring.

#### Monitoring

WirelessHART is particularly suitable for use in plant sections that are to be included in monitoring, but which do not have any existing MSR cabling, e.g. external tank stores or other installations where high cabling costs are anticipated. Data for the visualization can be retrieved from the IE/WSN-PA link via Industrial Ethernet or Modbus TCP.



Monitoring of process states via WirelessHART

#### Retrofitting for diagnostics and maintenance

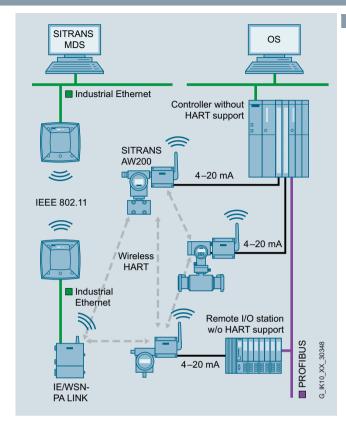
For this application, wireless adapters are looped into the 4-20 mA interface or screwed directly onto the HART device. The acyclic HART message frames are transmitted by radio between IE/WSN-PA LINK and a wireless adapter. Without affecting the operation of the plant, the wireless adapter modulates the acyclic HART message frames to the 4-20 mA interface or extracts them from the 4-20 mA interface.

The IE/WSN-PA LINK collects the data of all wireless adapters and transfers it via Industrial Ethernet to the diagnostics and maintenance station.

If greater distances between the IE/WSN-PA LINK and the monitoring station are to be spanned without cabling, this can be implemented by means of Industrial Wireless LAN with the access points and client modules of the SCALANCE W family.

WirelessHART products

IE/WSN-PA LINK



Retrofitting of plants for diagnostics and maintenance

#### Design

- 2 x 10/100/1 000 Mbit/s RJ45 ports, electrical (no integral switch; interfaces can be used, for example, for continuous connection to the plant network as well as the temporary connection of a PC)
- 1 x screw terminal for connection to Modbus RTU via RS 485
- 1 x screw terminal for the 24 V DC connection
- Rugged metal enclosure with IP65 protection for use outdoors, also in hazardous zone 2
- Mounting: wall or mast mounting (vertical);
   U-bolts for mast mounting are included in the scope of delivery.

#### Product versions

- With integral, non-detachable antenna
- Redundancy function and with N connector for connection of an external antenna

#### Function

#### WirelessHART

The IE/WSN-PA LINK establishes on the radio side an intermeshed wireless sensor network for communication with wireless field devices (e.g. transmitters). The data from the wireless field devices is received by the IE/WSN-PA LINK and transmitted via Industrial Ethernet to the connected systems. The supported wireless network is an open wireless network specified by the HART Communication Foundation (HCF) in accordance with the WirelessHART (HART V7.1) standard.

On the field device side, the IE/WSN-PA LINK requires field devices that support WirelessHART (HART). Existing field devices can be integrated by means of wireless adapters into the WirelessHART communication. To this end, the adapters are looped into the 4-20 mA interface. In addition, as many as four standard HART field devices with external power supply can be connected to the adapter in multidrop mode. Individually connected devices can be operated with the battery of the adapter.

The adapter wirelessly transmits all data and process values of the connected devices. The advantage of this solution is that tried and tested devices can continue to be used.

#### Industrial Ethernet

Via the Ethernet interface the IE/WSN-PA LINK supports the use of the HART OPC server and the Modbus TCP protocol.

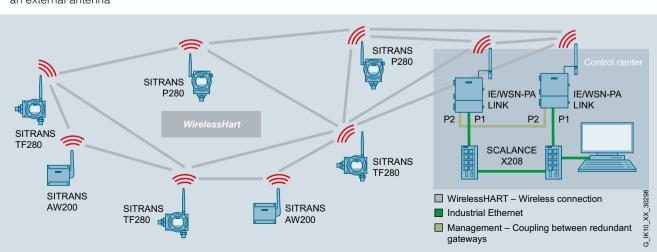
#### Configuration

The configuration is web-based, without additional software, and performed from the PC. By means of the web user interface it is also possible to display the device states and measured values of the WirelessHART devices.

## Increased availability of WirelessHART application due to redundancy mode

For increased availability requirements, the link can be used redundantly. The redundancy function is only available for the device variant with a connection for an external antenna.

Two links are connected to the same Ethernet subnet via a switch to provide the redundancy. The two links are connected to each other via an Ethernet cable (management coupling). One of the two links is configured as the active device. It carries out the communication between the control center and the WirelessHART wireless network under normal conditions. The second link is configured identically. It is used as a standby device. In a redundancy scenario, the standby device becomes the active device.



WirelessHART network operated with a redundant gateway

WirelessHART products

#### IE/WSN-PA LINK

#### Integration

#### Integration into automation systems

The IE/WSN-PA LINK can be integrated into automation systems via Ethernet or Modbus TCP. Communication modules (CP 343-1 or CP 443-1) are required to connect the IE/WSN-PA LINK to SIMATIC S7-300/400. Function blocks and technical support can be found at:

www.siemens.com/simatic-net/ik-info

#### Integration in PCS 7

For integration of the IE/WSN-PA LINK into PCS 7 you can obtain function blocks and technical support at:

www.siemens.com/simatic-net/ik-info

#### Technical specifications

	6GK1411-	6GK1411-
Dreduct type decimation	6CA40-0AA0	6CA40-0BA0 IE/WSN-PA LINK
Product type designation  Transfer rate	IE/WSN-PA LINK	IE/WSIN-PA LIINK
• at the interface 1	10 100 Mbit/s	
• at the interface 2	10 100 Mbit/s	
• at the interface 3	9.6 to 57.6 kbit/s	
Interfaces	9.0 to 37.0 to lt/s	
Number of electrical connections		
• at interface 1 in accordance with	1	
Industrial Ethernet		
<ul> <li>at interface 2 in accordance with Industrial Ethernet</li> </ul>	1	
• at interface 3 in accordance with RS 485	1	
<ul> <li>For power supply</li> </ul>	1	
Design of electrical connection		
• at interface 1 in accordance with Industrial Ethernet	RJ 45 port	
• at interface 2 in accordance with Industrial Ethernet	RJ 45 port	
• at interface 3 in accordance with RS 485	2-pin terminal strip	0
• For power supply	3-pin terminal strip	0
Interfaces wireless		
Number of radio cards permanently installed	1	1
Number of internal antennas	1	0
Number of electrical connections for external antenna(s)	0	1
Design of electrical connection for external antenna(s)	-	N-Connector
Supply voltage, current con-		
sumption, power loss	DC:	
sumption, power loss Type of power supply	DC	
sumption, power loss Type of power supply Supply voltage, external	24 V	
sumption, power loss Type of power supply Supply voltage, external  Minimum	24 V 20 V	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum	24 V 20 V 28 V	
sumption, power loss Type of power supply Supply voltage, external  Minimum	24 V 20 V	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maxi-	24 V 20 V 28 V	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum	24 V 20 V 28 V 0.5 A	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum	24 V 20 V 28 V 0.5 A	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature	24 V 20 V 28 V 0.5 A	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  During operating	24 V 20 V 28 V 0.5 A 12 W	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  During operating  During storage	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C	
sumption, power loss Type of power supply Supply voltage, external  Maximum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  During operating  During storage	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  During operating  uring storage  uring transport  Relative humidity at 25 °C without condensation during operating	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C	
sumption, power loss Type of power supply Supply voltage, external  • Minimum  • Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  • During operating  • During storage  • During transport  Relative humidity at 25 °C without condensation during operating phase, maximum	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 %	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum  Active power loss, maximum  Permitted ambient conditions  Ambient temperature  During operating  During storage  During transport  Relative humidity at 25 °C without condensation during operating phase, maximum  Protection class IP	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 %	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum  Protection class IP  Design, dimensions and weights	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 %	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 %	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna Depth of the housing	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm 89 mm	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna Depth of the housing Net weight	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna Depth of the housing Net weight Mounting type	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm 89 mm 4.54 kg	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna Depth of the housing Net weight Mounting type  Wall mounting	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm 89 mm 4.54 kg Yes	
sumption, power loss Type of power supply Supply voltage, external  Minimum  Maximum  Current consumed from external power supply at 24 V DC, maximum Active power loss, maximum  Permitted ambient conditions Ambient temperature  During operating  During storage  During transport Relative humidity at 25 °C without condensation during operating phase, maximum Protection class IP  Design, dimensions and weights Width of the housing Height of the enclosure  Without antenna  With antenna Depth of the housing Net weight Mounting type	24 V 20 V 28 V 0.5 A 12 W -40 +70 °C -40 +85 °C -40 +85 °C 90 % IP 65 229 mm 306 mm 354 mm 89 mm 4.54 kg Yes	nounting included

# Supplementary Components WirelessHART products

# IE/WSN-PA LINK

Wireless frequencies		Standards, specifications,	
Radio frequency with WirelessHART in the 2.4 GHz		approvals Standard for WirelessHART	HART V 7.1
frequency band		Standard for wireless communica-	
Initial value	2.4 GHz	tion IEEE 802.15.4	165
• End value	2.5 GHz	Certificate of suitability	
Performance data		• CE mark	Yes
WirelessHART		Concerning CSA	CSA Division 2 & Dust Ignition-proof
Number of WirelessHART devices	100		for Class I, Division 2, Groups A, B,
which can be operated			C, and D. Dust Ignition-proof for Class II, Groups E, F, and G / Suit-
Network latency	10.0		able for Class III Hazardous Loca-
<ul> <li>For 100 field devices and Wire- lessHART network maximum</li> </ul>	10 s		tions. / Install per Siemens drawing
• For 50 field devices and Wire-	5 s		A5E02467236A. Temperature Code: T4 (-40°C < Ta < 60°C) CSA Enclo-
lessHART network maximum			sure Type 4X
Transmission link between two devices with WirelessHART network		Concerning FM	FM Division 2, Non-Incendive for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class
Maximum	100 m		II, III, Division 1, Groups E, F, and G
• Note	Values may vary in the case of radio obstacles		/ Indoor and outdoor locations / NEMA Type 4X Temperature Code: T4 (-40°C < Ta < 60°C)
Protocol is supported HART	Yes	Concerning ATEX	ATEX type n, see note: Certificate
Product properties, functions,		- Gonderning / (TEX	number: Baseefa10ATEX0044X,
components general			ATEX marking: Ex II 3 G, Ex nA nL
Protocol is supported	.,		IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, ATEX Dust Igni-
<ul> <li>Address Resolution Protocol (ARP)</li> </ul>	Yes		tion-proof: Certificate number: Baseefa10ATEX0045X, ATEX mark-
• HTTP	Yes		ing: II 3 D, Ex tD A22 IP66 T135
• HTTPS	Yes		(-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Condi-
Modbus TCP	Yes		tions for safe handling during
Modbus TCP secure	Yes		installation: The device does not
Modbus RTU	Yes		pass the 500 V insulation test in accordance with paragraph 6.8.1 of
Product functions management, configuration			EN 60079-15:2005. This must be
Product function			taken into account when installing
Web-based management	Yes	- Di IFOF	the device.
DHCP client	Yes	Regarding IECEx	IECEx type n, see note: Certificate number: IECEx BAS 10.0014X, Ex
Product functions Diagnosis			nA nL IIC T4 (-40 °C <= Ta <= 60
Product function			°C), rated voltage: 28 V, IECEx Dust
Web-based diagnostics	Yes		Ignition-proof, see note: Certificate number: IECEx BAS 10.0015X, Ex
WirelessHART diagnostics via Modbus	Yes		tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated volt-
Product functions Redundancy			age: 28 V. Note on type n: Conditions for safe handling during
Product function device redundancy	No Yes		installation: The device does not pass the 500 V insulation test in
Product functions Security			accordance with paragraph 6.8.1 of
Product function			EN 60079-15:2005. This must be taken into account when installing
• Password protection - multilevel	Yes		the device.
<ul> <li>WirelessHART join key</li> </ul>	Yes	Regarding NEMA	-
<ul> <li>ACL - MAC-based</li> </ul>	Yes	Wireless approval	FCC and IC IC approval
<ul> <li>WirelessHART network ID</li> </ul>	Yes		approval
Protocol is supported SSL	Yes		
Principle of encryption	AES 128 bit		
Product functions Time			

Protocol is supported NTP

Yes

# **Supplementary Components**

#### IE/WSN-PA LINK

Selection and Ordering data	
	Article No.
IE/WSN-PA LINK	
Gateway between WirelessHART and Industrial Ethernet; transmission frequency: 2.4 GHz	
With integral, non-detachable antenna	6GK1411-6CA40-0AA0
N connector for connection of external antennas	6GK1411-6CA40-0BA0
Antennas	
Antennas with omni-directional characteristics; country permits, compact instructions (hard copy), German/English	
Wall or mast-mounting	
Antenna ANT792-6MN     Antenna gain including N-Connect connector 6 dBi, 2.4 GHz	6GK5792-6MN00-0AA6
Roof mounting	
ANT795-6MN antenna     Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz	6GK5795-6MN00-0AA6
Antenna mounting tool (ANT795-6MN)  Mounting tool for installation of	6GK5795-6MN01-0AA6
ANT795-6MN under a roof	
LP798-1N Lightning Protector	6GK5798-2LP00-2AA6
Lightning protector with N/N female/female connector, IP65 (-40 +100 °C)	
Antenna cables	
IWLAN N-Connect male/male flexible connection cable	
Flexible connecting cable for con- necting an external antenna; assembled with two N-Connect male connectors	
• 1 m • 2 m	6XV1875-5AH10 6XV1875-5AH20
• 5 m	6XV1875-5AH20
• 10 m	6XV1875-5AN10
HF coupling	6GK5798-0CP00-1AA0
N-Connect male/male connector for connecting the LP798-1N lightning protector	
Accessories	
IE FC M12 Plug PRO	
M12 plug-in connector suitable for on-site assembly (D-coded, IP65/IP67), metal housing, Fast-Connect connection system, for connecting HARTING adapter cables to the Industrial Ethernet	
• 1 unit	6GK1901-0DB20-6AA0
IE FC TP Standard Cable GP 2 x 2 (Type A)	6XV1840-2AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	

	Article No.
IE FC Stripping Tool	6GK1901-1GA00
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
Network components for IWLAN	see "Industrial Wireless Communication"
HARTING adapter cable 1) M12 female NPT 1/2 thread to RJ45 11cm, (minimum order quantity: 10); The adapter is provided for easy connection of the link to the Industrial Ethernet;	21036836420  Not included in the scope of delivery of the IE/WSN-PA link; You can find ordering information on the Internet at: http://www.harting.com
SITOP compact 24 V/ 0.6 A	6EP1331-5BA00
1-phase power supply with wide- range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	
1)	11 ( ) 50 ( ) 0

When using the Harting adapter cable for the Ethernet connection, the requirements for intrinsic safety approval are not applicable. When used in an application relevant to intrinsic safety guidelines, it requires acceptance by the appropriate approval agency.

#### More information

Current approvals can be found on the Internet at:

http://support.automation.siemens.com/WW/view/en/46374734



	Communication
8/2	HART protocol
8/3	WirelessHART
8/6	PROFIBUS
8/7	FOUNDATION Fieldbus
	WirelessHART Communication
8/8	Communication blocks
8/9	SITRANS MDS -
	Maintenance Diagnostic Station
	Software
8/11	
8/11	Software
8/11 8/21	Software SIMATIC PDM -
	Software SIMATIC PDM - Process Device Manager

#### Communication

#### **HART** protocol

#### Overview

HART is a widely used communication standard for field devices. Specification of HART devices takes place through the HCF (HART Communication Foundation).

The HART standard expands the analog 4 to 20 mA signal for modulated, industry-proven, digital signal transmission.

#### Benefits

- Service-proven analog measured value transmission
- Simultaneous digital communication with bidirectional data transmission
- Possibility of transmitting several measured variables from one field device (e.g. diagnosis, maintenance and process data)
- Connection to higher-level systems such as PROFIBUS DP
- Easy installation and startup

Use in conjunction with SIMATIC PDM

- Cross-vendor operation of all HART devices by means of standardized parameter records
- HART field devices that are described by HART DD are integrated in SIMATIC PDM through the HCF catalog. HART DD (Device Description) is standardized in SIMATIC PDM, multivendor and very widely used. Other HART field devices are integrated in SIMATIC PDM through EDD (Electronic Device Description)
- Easy operation and startup of field devices, also in hard-to-reach locations
- Expanded diagnosis, evaluation and logging functions

#### Application

These devices can be connected in different ways:

- Using the distributed I/O system
  - SIMATIC ET 200M with the HART modules
  - SIMATIC ET 200iSP with the HART modules or with analog modules 4 to 20 mA and a HART handheld communicator
- Using a HART modem, with which a point-to-point connection is established between the PC or engineering station and the HART device
- Using HART multiplexers, which are contained in the HART server of the HCF

#### Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using HART:

#### Measuring instruments for pressure

SITRANS P300

SITRANS P310

SITRANS P DS III

SITRANS P410

SITRANS P500

#### Measuring instruments for temperature

SITRANS TE

SITRANS TH300

SITRANS TR300

SITRANS TW

#### **Flowmeters**

SITRANS F M MAG 5000

SITRANS F M MAG 6000 19" / IP67

SITRANS F M MAG 6000 I / I Ex

SITRANS F M Transmag 2

SITRANS F C MASS 6000 19" / IP67 / Ex d

SITRANS F C FCT030

SITRANS FUS060

SITRANS FX300

#### Measuring instruments for level

Pointek CLS500

SITRANS Probe LR

SITRANS Probe LU

SITRANS LUT400

SITRANS LR200

SITRANS LR250

SITRANS LR260 SITRANS LR460

SITRANS LR560

SITRANS LG240 / LG 250 / LG 260 / LG 270

SITRANS LC500

#### **Positioners**

SIPART PS2

#### Power supply units and isolation amplifiers

SITRANS I

#### Selection and Ordering data

Article No.

#### HART modem

With USB connection

► Available ex stock

7MF4997-1DB

Communication

WirelessHART

#### Overview

WirelessHART is the first international industry standard for wireless communication at field level in the area of process automation. Hence this is the first time users are provided with a standard for wireless communication at field level which ensures the interoperability of instruments and components from different manufacturers.

#### Benefits

WirelessHART enables access to the following:

- · Measuring and control values
- Parameters

of field devices with HART interface. These usually include pressure, temperature, level or flow transmitters or actuators.

WirelessHART allows for the following:

- wireless transmission of measured values and their status
- · wireless parameterization and diagnosis of field devices

The WirelessHART adapter can be used to enable field devices with HART interfaces (that are designed for wired communication) for wireless communication. This allows users to continue using their proven devices while benefiting from and participate in addition in advantages offered by wireless communication.

#### Application

Looking at the large number of possible applications and configurations, we generally differentiate between two application types.

Background for the first type is the fact that according to estimates forwarded by the HART Communication Foundation (HCF), approximately 85 % of the over 30 million HART devices in operation are used in an environment where only the 4 to 20 mA interface rather than the HART interface of the device is used on a system level. Generally, data on the device can only be read on site. This is of particular disadvantage with devices that contain self-diagnostic functions - that's what we call "stranded diagnosis".

In these cases, a WirelessHART adapter can offer assistance. Connected to the 4 to 20 mA loop, it allows central access to the device based on wireless communication. It does not affect process control systems which continue to receive the measured value using the 4 to 20 mA loop.

Central access is enabled through a diagnostic station with SIMATIC PDM and SITRANS MDS software.

Main advantages:

- · Increases the availability of the plant
- · Increases plant transparency
- Reduces costs due to employing a predictive rather than preventative maintenance concept
- Reduces travel time in larger systems based on central access to field instrumentation

In the second application the 4 to 20 mA loop is omitted, all data including measured process values and diagnostic information are transmitted wirelessly to a process control system, for example.

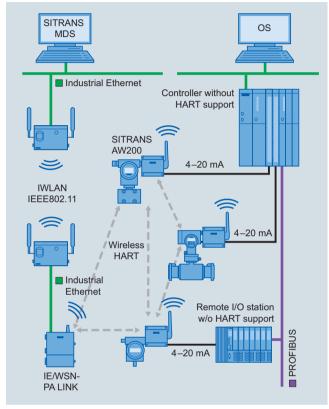
Main advantages are:

- No planning and installation of data cables, resulting in significant cost reductions
- Higher system transparency due to additional and hitherto unfeasible installation of measuring points
- Process optimization due to flexible, temporary and cost-effective measuring points via wireless communication
- Utilization of proven devices by using adapters
- The WirelessHART meshed network also makes it possible to bridge longer distances

#### Design

This section introduces the application types described in the previous section in greater detail.

The figure below shows a typical situation for the first application type.



The adapter is connected to the 4 to 20 mA loop, which is used to transmit the measured value to the control system, or transmit the setpoint to an actuator. The existing control system is not affected by the WirelessHART adapter.

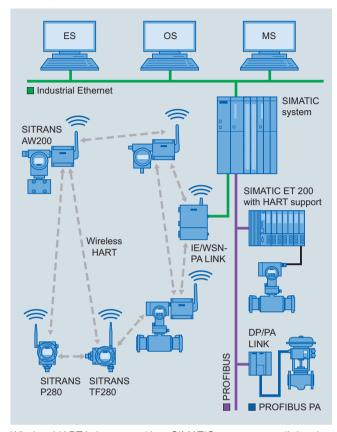
The data, in particular diagnostic data from the devices is transmitted to the IE/WSN-PA LINK via the connected adapter and the WirelessHART network. The link provides this data to a diagnostic and maintenance station with installed SITRANS MDS software and SIMATIC PDM via an industrial Ethernet. Industrial wireless LAN can be used to save on the installation costs required for Ethernet wiring. An extensive product portfolio of Scalance W components is available for this purpose.

The functionality of related to the SITRANS MDS is described in great detail on page 8/9 of this catalog.

#### Communication

#### WirelessHART

The figure below shows a typical situation for the second application type.



WirelessHART is integrated into SIMATIC systems parallel to the wire-connected devices with HART or PROFIBUS interfaces. In this case, the 4 to 20 mA line to the control system is not required: all data, i.e. process values, parameters, diagnostic information and functions, is supplied to the automation system on a wireless basis. This is mainly useful for replacement and expansion measures related to existing systems, and of course also new systems, but also for temporary and mobile measurements.

The field devices are standard instruments with connected adapters, or those with integrated wireless communication.

In principle, a differentiation needs to be made between wireless communication and the power supply for the devices.

When installing a field device, the planning and installation of the data cable to the control system is usually considered a significant cost driver. This factor is greatly reduced when using wireless communication.

When using 4 to 20 mA/HART field devices with adapters, the question of powering up always arises - in contrast to battery-powered field devices with integrated wireless modules.

It is important to distinguish between two and four-wire devices here. Under certain circumstances, the SITRANS AW200 adapter can take over the supply of a connected two-wire device. The power consumption of the field device plays an important role here. If it is too high, an additional power supply becomes necessary. If more than one device is connected to the SITRANS AW200 adapter, an additional power supply is required.

Four-wire devices always require an additional power supply.

#### Function

The properties of WirelessHART can be summarized as follows:

- Simplicity in handling and engineering
- Secure communication
- · Availability in network

#### Simplicity in handling and engineering

- Utilize current tools, same workflow
   The description of devices and adapter is carried out using proven EDDL technology. SIMATIC PDM continues to be used as a tool.
- Multiple power supply options
   Devices can be operated externally with 24 V DC, external or
   integrated battery packs as well as solar cells. The option of
   using energy from the process or the environment has been
   researched at universities and industry for some time. It is expected that results and products will be available in the medium term.
- Reduced installation costs
   Depending on use, installation costs for data cables or power supply cables are not required.
- Coexists with other wireless networks WirelessHART only uses the ISM band in the 2.4 GHz area, since it is available across the globe. However, it is also used by Industrial Wireless LAN (IWLAN), for example. For this reason, a requirement to allow WirelessHART to co-exist with Wireless LAN networks was an absolute requirement when this technology was defined. This coexistence has been achieved by constantly changing the channels and hence frequencies. This is also called "channel hopping". Moreover, individual channels can be completely disabled through so-called "blacklisting", for example if they are locally used by IWLAN.
- Support of star-shaped and meshed network topologies
   Networks can be built in both a star-shaped as well as meshed
   structure. The advantage of star-shaped networks with a gateway as the centre is that it allows for fast update cycles. However, the range of the network is limited to a maximum of approx. 200 m without obstacles between the gateway and the
  devices.

The advantage of meshed networks is their greater range, since each participant in the network is also a repeater and forwards the data of remote participants towards the gateway. The disadvantage: increased transmission times for data between the field device and the gateway.

- Faster commissioning
- Once the device is installed, it can usually be commissioned right away, since the usual waiting time for completing the installation of the cables does not apply in this case.
- Self-organizing and self-healing networks
  WirelessHART networks are automatically organized, built and
  administered by the Network Manager. Engineering is usually
  not required.

The Network Manager is implemented in the IE/WSN-PA LINK, the WirelessHART gateway from Siemens.

It calculates the optimal connection routes between the network participants and defines an alternative path that can be used in the case of disruptions in advance. In that sense, the network can be considered self-healing.

In addition, the Network manager also defines the channels or frequencies to be used for all communication.

Statistics regarding communication are compiled automatically and are available to users.

- Security always active
   All designated mechanisms with regard to security are available automatically, and do not require any engineering.
- Make changes in the network without the need for configuration. The Network Manager automatically adds and withdraws participants to/from the network.

Communication

WirelessHART

#### Secure communication

- Encryption All information is automatically encrypted with 128 bit AES prior to transmission
- Specific keys for each data packet
- Data integrity Each data packet is checked for changes or damage during transport.
- Device authentication
   Each device must know the network identification number as well as the join key. Otherwise the Network Manager does not include it in the network.
- Channel Hopping
   The channel which is used will be changed according to the Network manager's specifications after each telegram. This provides an added level of security against spying activities.
- Failed authentification report
   Each unsuccessful attempt by a participant to join the network
   will be recorded and made available to the user.

#### Availability in network

- Communication based on IEEE 802.15.4-2006
   Wireless communication takes place on the basis of a proven
   industry standard. It allows for very minimal power consumption.
- Utilization of ISM band (2.4 GHz)
   This band can be used worldwide without incurring additional costs.
- Channel hopping overcomes disruptions
   Disruptions are usually limited to a small frequency range.
   By constantly changing the channel, it is possible to overcome
   the effects of such disruptions and hence increase the net work's reliability.
- Channel Black Listing permanently blocks disrupted channels.
  - When operating another network at the same location, the channels occupied by that network can be blocked in the WirelessHART network.
- Self-healing network
  This aspect has already been discussed
- Redundant communication paths
   The Network manager automatically calculates redundant
   communication paths. This significantly increases the level of
   availability.

#### Software Overview

Applications 1 and 2 will require the following software products

	Component	Products	Article No.
_	Maintenance Diagnostic Station	SITRANS MDS	1)
type	Process Device Manager	SIMATIC PDM and Options	See page 8/17
		HART OPC Server V3.2	Included in SIMATIC PDM <sup>1)</sup>
cat	WirelessHART gateway	IE/WSN-PA LINK with integrated non-removable antenna	6GK1411-6CA40-0AA0
Application	WirelessHART adapter	SITRANS AW200 <sup>2)</sup>	7MP3112-1AA00-0AA0
	Process control system	SIMATIC PCS 7	
be 2		SIMATIC S7/SIMATIC PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK	9AE4110-3AA00
ë Ş	WirelessHART gateway	IE/WSN-PA LINK with integrated non-removable aerial <sup>2)</sup>	6GK1411-6CA40-0AA0
atio	Field devices	SITRANS AW200 <sup>2)</sup>	7MP3112-1AA00-0AA0
Application type		SITRANS AW210 <sup>2)</sup>	7MP3111
ΑÞ		SITRANS P280 <sup>2)</sup>	7MP1120
		SITRANS TF280 <sup>2)</sup>	7MP1110

<sup>1)</sup> You can also contact your Siemens contact person.

#### More information

More detailed information on the required WirelessHART software and hardware components can be found in the FI 01 catalog or at www.siemens.com/wirelesshart.

<sup>2)</sup> Other versions and accessories can be found in the product descriptions of this catalog

#### Communication

#### **PROFIBUS**

#### Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the manufacturing industry and process engineering. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

PROFIBUS is today's most successful open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

#### Benefits

- A uniform modular system from the sensor into the control level enables new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- · Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire lines for joint energy supply and data transmission
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also cross-vendor)
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

#### Application

PROFIBUS is suitable for fast communication with distributed I/Os (PROFIBUS DP) in production automation as well as for communication tasks in process automation (PROFIBUS PA). It is the first field bus system that meets the demands of both areas with identical communication services.

The transmission technique of the PROFIBUS PA is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

Using SIMATIC PDM (Process Device Manager), a uniform and cross-vendor tool for configuring, parameterizing, commissioning and diagnosis of intelligent process devices on the PROFIBUS, it is possible to configure a wide variety of process devices from different manufacturers using one uniform graphical user interface.

PROFIBUS PA can just as readily used in standard environments as well as hazardous areas. For use in hazardous areas, PROFIBUS PA and all connected devices have to be designed with type of explosion protection Ex [i].

The uniform protocol of PROFIBUS DP and PROFIBUS PA enables the two networks to be interlinked, thus combining time-based performance with intrinsically safe transmission.

#### Function

PROFIBUS PA expands PROFIBUS DP with near-process components for the direct connection of actuators and sensors.

For PROFIBUS PA the RS 485 transmission technique was replaced by a different technique optimized for intrinsically safe application. Both techniques are internationally standardized in IEC 61158.

PROFIBUS PA uses the same communication protocol as PROFIBUS DP; the communication services and telegrams are identical.

For PROFIBUS PA the data and energy supply for the field devices can be directed through a 2-wire line.

#### Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using PROFIBUS:

#### PROFIBUS PA

#### Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

#### Measuring instruments for temperature

SITRANS TH400

#### **Flowmeters**

SITRANS F M MAG 6000 19" / IP67

SITRANS F M MAG 6000 I / I Ex

SITRANS F M Transmag 2

SITRANS F C MASS 6000 19" / IP67 / Ex d

SITRANS FUS060

#### Measuring instruments for level

Pointek CLS200

Pointek CLS300

SITRANS Probe LU

SITRANS LR200

SITRANS LR250

SITRANS LR260

SITRANS LR460 SITRANS LR560

#### **Electropneumatic positioners**

SIPART PS2

#### Acoustic sensor for pump monitoring

SITRANS DA400

#### PROFIBUS DP

#### **Flowmeters**

SITRANS F M MAG 6000 19" / IP67

SITRANS F M MAG 6000 I

SITRANS F C MASS 6000 19" / IP67

SIFLOW FC070 (via ET200M)

#### Measuring instruments for level

HydroRanger 200

MultiRanger 100/200

SITRANS LU01, LU02, LU10

#### Acoustic sensor for pump monitoring

SITRANS DA400

Communication

#### **FOUNDATION Fieldbus**

#### Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the process engineering industry. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

Like PROFIBUS PA, the FF bus (FOUNDATION Fieldbus) is an open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

#### Benefits

- A uniform modular system from the sensor to the connection to the control level enables new plant concepts
- Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint energy supply and data transfer
- Reduced cabling costs through savings of material and installation time.
- Reduced configuration costs through central, simple engineering of the field devices, also cross-vendor
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

#### Application

The transfer technology of the FOUNDATION Fieldbus is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

FOUNDATION Fieldbus can just as readily be used in standard environments as in hazardous areas. For use in hazardous areas, FOUNDATION Fieldbus and all connected devices have to be designed with type of explosion protection Ex [i].

#### Function

FOUNDATION Fieldbus enables the direct connection of actuators and sensors.

FOUNDATION Fieldbus is based on a transfer optimized for intrinsically safe application. The transfer technology is internationally standardized in IEC 61158.

For FOUNDATION Fieldbus the data and energy supply for the field devices can be directed through a 2-wire cable.

FOUNDATION Fieldbus enables device-to-device communication ("control in the field").

#### Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using Foundation Fieldbus:

#### Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

#### Measuring instruments for temperature

SITRANS TH400

#### **Electropneumatic positioners**

SIPART PS2

#### **Flowmeters**

SITRANS F M MAG 6000

SITRANS F M MAG 6000 L/LEX

SITRANS F C MASS 6000

#### Level meters

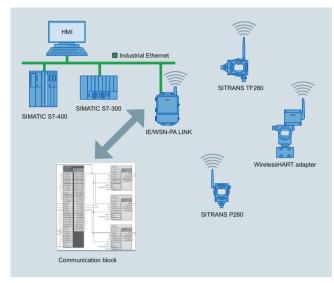
SITRANS LR250

SITRANS LR560

WirelessHART Communication

#### **Communication blocks**

#### Overview



The WirelessHART communication blocks implement the communication between S7/PCS 7 automation systems and WirelessHART field devices. They communicate via the IE/WSN-PA LINK using the Modbus TCP/IP protocol. Preconfigured communication blocks simplify the engineering process. Symbols and face plates are included in the delivery for use with SIMATIC PCS 7 OS or SIMATIC WinCC.

#### Benefits

A library, which can be installed, offers pre-fabricated blocks and hence an easy way to integrate WirelessHART devices into the SIMATIC automation world.

Simple configuration thanks to:

- Prefabricated function blocks for IE/WSN-PA LINK and WirelessHART devices
- SIMATIC PCS 7 OS or SIMATIC WinCC symbols and face plates are included
- Configuring help for IE/WSN-PA LINK in line with function blocks
- Output of quality codes for respective process values
- Analysis of IE/WSN-PA LINK diagnostic information

#### Application

WirelessHART communication blocks are used where SIMATIC automation systems communicate with WirelessHART devices via the IE/WSN-PA LINK gateway.

#### Function

The function blocks cyclically communicate with the IE/WSN-PA LINK via Modbus TCP/IP. Process values of WirelessHART devices as well as their status are read and made available at the function block outputs. Furthermore, selected status information of the IE/WSN-PA LINK is also made available at another building block. This information includes connection status, condition of the wireless network and other diagnostics. Precondition of the usage of these communication blocks is a TCP/IP connection, engineered in NetPro in the Engineering Station of Simatic PCS 7. Currently this requires a CP343 or a CP443-1.

#### Configuration

The standard S7 or PCS 7 engineering tools CFC, KOP, FUP can be used for the communication block engineering. Connection planning is done in NetPro. A configuration example for configuring the IE/WSN-PA LINK makes it easy to assign the WirelessHART devices to the communication blocks which need to be engineered.

#### More information

You can obtain function blocks and technical support for integrating the IE/WSN-PA LINK in PCS 7 at the following address:

Siemens AG DF CS DS PAS R&D-AP Roland Heid Siemensallee 84 76187 Karlsruhe Germany Tel: +49 721 595-6380

E-Mail: function.blocks.industry@siemens.com

#### Selection and Ordering data

Article No.

S7/PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK

S7-300 or S7-400, including face plate

9AE4110-3AA00

WirelessHART Communication

**SITRANS MDS - Maintenance Diagnostic Station** 

#### Overview



Maintenance Diagnostic Station

SITRANS MDS for flexible and automated diagnostic process-

- Central display of diagnostic information from HART devices. which was only readable on site until now.
- Adjustable updating period for each device
- · Clear visualization of diagnostic status of all devices
- · Simply transfer of SIMATIC PDM configuring data
- Windows-based application

#### Benefits

SITRANS MDS in cooperation with SIMATIC PDM increases significantly the transparency of a plant.

The main advantages of SIMATIC MDS are as follows:

- Increase transparency of the plant by reading diagnostic infor- Integration mation from accessible devices and providing a well-organized representation of this information
- Representation of diagnostic status of a device as in SIMATIC PCS 7 or NAMUR NE 107 (switchable)
- Ease of use through use of SIMATIC PDM project data
- The update cycle for the diagnostic status can be uniformly set as the default value for all devices ...
- ... as well as for each device individually

#### Application

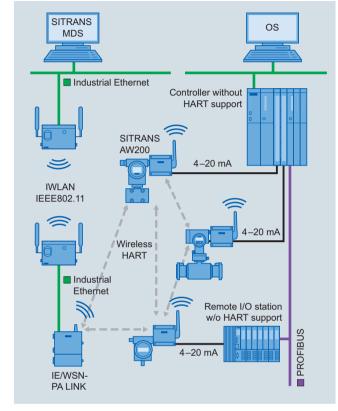
SITRANS MDS increases the transparency of a plant by centrally collecting diagnostic information, directly from the accessible field devices. In principle, all devices that are integrated in SIMATIC PDM can be included in the collecting process.

SITRANS MDS can be used where the installed automation system does not support an integrated acyclic communication of parameters and diagnostic information with the devices. In the case of HART devices, this applies to 85% of all installed

The modern SIMATIC PCS 7 process control system allows for this type of continuous communication from the engineering system up to the devices. It also features a decidedly higher performance asset management system. The use of SÍMATIC MDS therefore does not make sense in a SIMATIC PCS 7 environment and is hence not approved for that purpose.

## Design

SITRANS MDS uses SIMATIC PDM project data to read and display diagnostic data from accessible devices.



SITRANS MDS is installed on a PC together with SIMATIC PDM. Only the stand-alone version is used in this case.

#### Configuration

Configuration required for SITRANS MDS is adopted from SIMATIC PDM. Only the project name must be entered.

Very few other entries are required, such as the definition of update periods.

WirelessHART Communication

#### **SITRANS MDS - Maintenance Diagnostic Station**

#### Technical specifications

SITRANS MDS Maintenance Diagr	ostic Station			
Operating system	Microsoft Windows XP professional SP2/SP3			
Additionally required software				
SIMATIC PDM as of V 6.05 and options				
• SIMATIC PDM Basic (4 Tags)	6ES7 658-3AX16-0YA5			
• SIMATIC PDM service (128 Tags)	6ES7 658-3JX16-0YA5			
• SIMATIC PDM Option HART Mux	6ES7 658-3EX16-2YB5			
	Additional options to increase number of measuring points			
PC hardware	600 MHz 256 MB *) XGA 1024 x 768 16 Bit color depth *) main memory of at least 512 MB is recommended Up-to-date information can be found in the description for SIMATIC PDM			

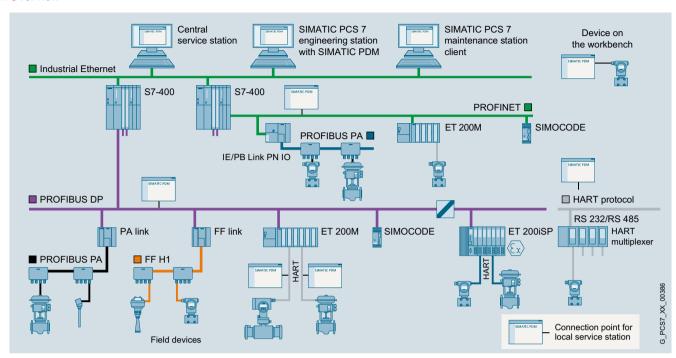
## Selection and Ordering data

SITRANS MDS is a software package which is delivered together with the IE/WSN-PA LINK for Version 1.0.

Software

#### **SIMATIC PDM Process Device Manager**

#### Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendorindependent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

Using *one* software, SIMATIC PDM enables the processing of more than 2 500 devices from Siemens and over 200 vendors worldwide on *one* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open device manager available in the world. Devices which previously were not supported can be integrated in SIMATIC PDM by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- · Uniform presentation and operation of devices
- Uniform representation of diagnostics information
- · Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- · Increasing the operational reliability
- Reducing the investment, operating and maintenance costs

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated in it and transmits parameter data and diagnostic information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station.

As an option, SIMATIC PDM can also be started on any SIMATIC PCS 7 maintenance station client (MS Client) in order to parameterize and diagnose the devices integrated per Electronic Device Description (EDD). In this context, SIMATIC PDM user administration based on SIMATIC Logon allows various roles with defined function privileges to be assigned to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices described per Electronic Device Description (EDD), SIMATIC PDM delivers a range of information for display and further processing on the maintenance station, e.g.:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (e.g. local configuration changes)
- Information on changes (audit trail report)
- · Parameter information

Software

#### **SIMATIC PDM Process Device Manager**

#### Application

Components	Product packages							
	SIMA	TIC PDM stand-	alone	SIMATIC PDM system-integrated				
	Minimum configuration	Basic configuration		Application-specific configurations				
	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7			
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2	
SIMATIC PDM TAGs <sup>1)</sup> in product package	1	4	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100	
SIMATIC PDM expansion options								
Count Relevant - 10 TAGs Licenses - 100 TAGs (accumulative) - 1 000 TAGs	cannot be expanded	0	0	0	0	0	0	
SIMATIC PDM Basic		•	•	•	•	•	•	
SIMATIC PDM Extended	_	0	0	•	•	•	•	
SIMATIC PDM integration in STEP 7/PCS 7		0	0	•	•	•	•	
SIMATIC PDM routing		0	0	0	•	•	•	
SIMATIC PDM Server	_	0	0	0	0	•	0	
SIMATIC PDM Communication FOUNDATION Fieldbus	_	0	0	0	0	0	•	
SIMATIC PDM HART server		0	0	0	0	0	0	
SIMATIC PDM command interface <sup>2)</sup>		0	0	-	-	-	_	

#### SIMATIC PDM product structure

- Product component is part of the product package
- o Optional product component for the product package; order additive
- Product component is not relevant for the product package or not available

#### Customer-oriented product structure

SIMATIC PDM is highly versatile in the context of Totally Integrated Automation (TIA): Stand-alone or system-integrated in a SIMATIC PCS 7 / SIMATIC S7 configuration environment.

The customer-oriented products structure of SIMATIC PDM helps you to adapt the scope of functions and performance to your individual requirements. You have the following options:

#### SIMATIC PDM stand-alone

- Local service station on a mobile computer with a local bus connection or with direct connection to the device, optionally with:
  - SIMATIC PDM Single Point for processing a single field device via a point-to-point coupling
  - SIMATIC PDM Service for extended service tasks
- Central service station on a stationary computer on the system bus with access to devices that are connected to the buscoupled S7-300/S7-400/S7-1500 automation systems via PROFIBUS field bus:
  - SIMATIC PDM Service for extended service tasks in combination with the SIMATIC PDM Routing option
- Product package SIMATIC PDM Basic as the basis for an individual SIMATIC PDM configuration with optional product components (see table)

#### SIMATIC PDM system-integrated

- Product packages for integration of SIMATIC PDM in the engineering system (engineering toolset) and Maintenance Station of the SIMATIC PCS 7 process control system:
  - SIMATIC PDM PCS 7
  - SIMATIC PDM PCS 7 Server (enables SIMATIC PDM to be started on any MS client)
  - SIMATIC PDM PĆS 7-FF (also supports the FOUNDATION Fieldbus H1)
- Product package SIMATIC PDM S7 for integration in a SIMATIC S7 configuration environment

In some circumstances, the various product packages can be expanded with optional product components (for details, see the Design section).

#### Selection criteria

In addition to considering the environment of use and the functional and performance features when selecting the product (see table in "Design" section), also observe the system requirements (see "Technical specifications" section).

<sup>1)</sup> For TAG definition, see "Design" section under "SIMATIC PDM TAGS"

<sup>&</sup>lt;sup>2)</sup> Only for special applications, not envisaged for wide use: Programming knowledge is necessary.

Software

# SIMATIC PDM Process Device Manager

# Design

Product range	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7		
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2
TAGs contained	1	4	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
Project: Create offline	•	•	•	•	•	•	•
Project: Usable TAG extensions	-	•	•	•	•	•	•
Project: Process device network view	•	•	•	•	•	•	•
Project: Process device plant view	•	•	•	•	•	•	•
Project: Export/import devices	-	-	•	-	-	-	-
Project: Export/import parameters	-	0	•	•	•	•	•
Project: HW Config	-	0	0	•	•	•	•
Project: Utilization of SIMATIC PDM options	-	•	•	•	•	•	•
Project: Integration in STEP 7/PCS 7	-	0	0	•	•	•	•
Communication: HART modem	•	•	•	•	•	•	•
Communication: HART interface	•	•	•	•	•	•	•
Communication: PROFIBUS DP/PA	•	•	•	•	•	•	•
Communication: HART over PROFIBUS DP	•	•	•	•	•	•	•
Communication: FF H1	-	o <sup>1)</sup>	o <sup>1)</sup>	0	0	0	•
Communication: Modbus	•	•	•	•	•	•	•
Communication: Ethernet	•	•	•	•	•	•	•
Communication: PROFINET	•	•	•	•	•	•	•
Communication: HART over PROFINET	•	•	•	•	•	•	•
Devices: Export/import parameters	-	0	•	•	•	•	•
Devices: Comparison of parameter values	-	0	•	•	•	•	•
Devices: Saving parameters	•	•	•	•	•	•	•
Devices: Change log (Audit Trail)	-	0	•	•	•	•	•
Devices: Calibration report	-	0	•	•	•	•	•
Devices: Print function	•	0	•	•	•	•	•
Devices: Document manager	-	0	•	•	•	•	•
Lifelist: Basic functionality	•	•	•	•	•	•	•
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	-	0	•	•	•	•	•
Communication: S7 routing	-	0	0	0	•	•	•
Communication: HART multiplexer	-	0	0	0	0	0	0
Communication: Wireless HART	-	0	0	0	0	0	0
Function: HART SHC mode (increased communication speed)	•	•	•	•	•	•	•
Function: Device parameterization on PCS 7 maintenance station clients	-	0	0	0	0	•	0

#### SIMATIC PDM overview of functions and features

- Product component is part of the product package
- o Optional product component for the product package; order additive
- Product component is not relevant for the product package or not available

<sup>1)</sup> Not in stand-alone mode

Software

#### **SIMATIC PDM Process Device Manager**

#### SIMATIC PDM stand-alone product range

#### SIMATIC PDM Single Point V8.2

This minimum configuration with handheld functionality is designed for processing exactly *one* field device via point-to-point coupling. Additional functions or SIMATIC PDM TAGs are not possible. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible. The device functions are supported as defined in the device description.

The following types of communication are possible:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

#### SIMATIC PDM Basic V8.2

Provided the system requirements are met, SIMATIC PDM Basic can be used for stand-alone operation on any computer (IPC/notebook) with local connection to bus segments or direct connection to the device. The product package features all the basic functions required for operation and parameter assignment of the devices and is enabled for the following communication modes:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

As a basic block for individual configuration, SIMATIC PDM Basic can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs.

#### SIMATIC PDM Service V8.2

The product package for mobile servicing applications can be executed on any computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

#### It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 100 SIMATIC PDM TAGs

Similar to SIMATIC PDM Basic, SIMATIC PDM Service can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGS.

#### SIMATIC PDM system-integrated product range

#### SIMATIC PDM S7 V8.2

The product package designed for use in a SIMATIC S7 configuration environment requires the installation of STEP 7 V5.5+SP4. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

#### SIMATIC PDM PCS 7 V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. SIMATIC PDM can then be integrated in the engineering toolset of the SIMATIC PCS 7 Engineering System V8.1. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

#### SIMATIC PDM PCS 7 Server V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Server option. It is then possible to parameterize field devices integrated per Electronic Device Description (EDD) on any client of the SIMATIC PCS 7 Maintenance Station V8.1.

SIMATIC PDM PCS 7 Server can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

#### SIMATIC PDM PCS 7-FF V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Communication FOUNDATION Fieldbus option. SIMATIC PDM can then also parameterize field devices on the FOUNDATION Fieldbus H1.

SIMATIC PDM PCS 7-FF can be expanded with the functional options SIMATIC PDM Server and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

Software

#### **SIMATIC PDM Process Device Manager**

#### Optional product components

#### SIMATIC PDM Extended V8.2 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- · Extended information in the Lifelist
- Export and import functions
- · Print functions
- · Document manager
- Comparison function

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

#### SIMATIC PDM integration option in STEP 7/PCS 7 V8.2

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

#### SIMATIC PDM Routing V8.2 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing is offered as an optional product component for SIMATIC PDM Basic, SIMATIC PDM Service, and SIMATIC PDM S7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF.

#### SIMATIC PDM Server V8.2 option

This option is intended for use of SIMATIC PDM in the SIMATIC PCS 7 Maintenance Station V8.1. Selected field devices can then be handled using the SIMATIC PDM configuration GUI on each client of the SIMATIC PCS 7 Maintenance Station V8.1.

# SIMATIC PDM Communication FOUNDATION Fieldbus V8.2 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

#### SIMATIC PDM HART Server V8.2 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, wireless HART field devices can also be parameterized with SIMATIC PDM.

#### SIMATIC PDM Command Interface V8.2 option

SIMATIC PDM configurations for stand-alone operation, based on the SIMATIC PDM Basic or SIMATIC PDM Service product package, can be remote-controlled by this option with regard to configuration and field device operation.

Note: The SIMATIC PDM Command Interface option can only be used specific to a project. It is not envisaged for wide use. Programming knowledge is necessary.

#### SIMATIC PDM TAGs (version-independent)

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM TAG corresponds to a SIMATIC PDM object, which represents individual field devices or components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. SIMATIC PDM TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

#### SIMATIC PDM Software Media Package V8.2

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, type of delivery "Package" (not with optional product components), a SIMATIC PDM Software Media Package is supplied together with each ordering item. Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

- Stand-alone operation
- Storage functions disabled
- · Export and import functions disabled
- · Expanded functionality disabled
- · Communication functions restricted

#### Information on ordering and delivery

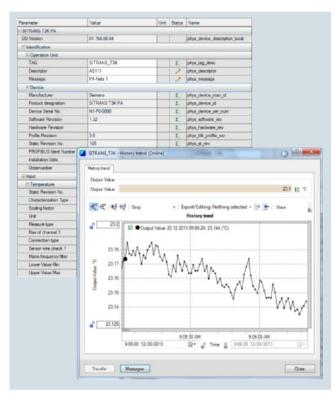
SIMATIC PDM is among the products for which the installation software is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit when supplied in package form.

The number of delivered software media packages can be determined by the number of ordered items. You can find additional information in the ST PCS 7 catalog.

Software

#### **SIMATIC PDM Process Device Manager**

#### Function



SIMATIC PDM, parameter view and trend window

#### SIMATIC PDM core functions

- Creation of project-specific device libraries
- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- · Plausibility testing of data input
- · Device identification and testing
- Device status indication (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

#### Integration

#### Device integration

SIMATIC PDM supports all devices described by EDD (Electronic Device Description). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time, it is the guideline of the established organizations for

- PROFIBUS and PROFINET (PI PROFIBUS & PROFINET International)
- HART (HCF: HART Communication Foundation)
- FF (Fieldbus Foundation)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or the current HCF or Fieldbus Foundation libraries. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. Existing devices can be updated, and further devices integrated into SIMATIC PDM, by simply importing the manufacturer's device-specific EDD.

Fieldbus Foundation provides pre-defined device descriptions (standard DD) for the basic functions of specific field device types. The basic functions are implemented using various standard function and transmission blocks.

#### Technical support

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

#### Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

www.siemens.com/automation/support-request

#### Contacts in the Region

The Technical Support responsible for your Region can be found on the Internet at:

www.automation.siemens.com/partner

#### Technical specifications

# SIMATIC PDM V8.2 Hardware PG/PC/notebook with processor corresponding to operating system requirements Operating systems (alternative) Windows 7 Professional/Ultimate/Enterprise SP1 (32-bit/64-bit) Windows Server 2008 R2 SP1 Standard Edition (64-bit) Integration in STEP 7/PCS 7 • SIMATIC PCS 7 V8.1 (incl. update 1)

• STEP 7 V5.5+SP4

Software

# SIMATIC PDM Process Device Manager

Ordering data	Article No.		Article No.
SIMATIC PDM stand-alone		Configuration for mobile service	
product packages		SIMATIC PDM Service V8.2	
Minimum configuration  SIMATIC PDM Single Point V8.2 including 1 TAG; product package for operation and configuration of		Product package for stand-alone user in service, with  SIMATIC PDM Basic incl. 4 TAGs  100 TAGs	
one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET		6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard	
Additional functions or SIMATIC PDM TAGs are not possible		64-bit, floating license for 1 user	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		Delivery form package     (without SIMATIC PCS 7 Software     Media Package)     License key USB stick and certificate of license, bundled with     1 × SIMATIC PDM Software Media     Package per ordering position	6ES7658-3JD28-0YA5
Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	6ES7658-3HA28-0YA5	<ul> <li>Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installa-</li> </ul>	6ES7658-3JD28-0YH5
<ul> <li>Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online</li> </ul>	6ES7658-3HA28-0YH5	tion software also available sepa- rately as SIMATIC PDM Software Media Package.	
certificate of license Notes:		SIMATIC PDM system-integrated product packages	
E-mail address required; installa- tion software also available sepa- rately as SIMATIC PDM Software Media Package.		Configuration for integration in SIMATIC S7 configuration environment	
Basic configuration for		SIMATIC PDM S7 V8.2	
individual product packages  SIMATIC PDM Basic V8.2 including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET),		Product package for use in a SIMATIC S7 configuration environment, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM integration in STEP 7/PCS 7 - 100 TAGs	
Modbus, Ethernet or PROFINET 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or		6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
Windows Server 2008 R2 Standard 64-bit, floating license for 1 user • Delivery form package (without SIMATIC PCS 7 Software	6ES7658-3AB28-0YA5	Note: STEP 7 V5.5+SP4 is required to use the full functionality of SIMATIC PDM S7 V8.2!	
Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position		Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 x	6ES7658-3KD28-0YA5
Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installa-	6ES7658-3AB28-0YH5	SIMATIC PDM Software Media Package per ordering position  Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license	6ES7658-3KD28-0YH5
tion software also available sepa- rately as SIMATIC PDM Software Media Package.		Notes: E-mail address required; installa- tion software also available sepa- rately as SIMATIC PDM Software Media Package.	

Software

#### **SIMATIC PDM Process Device Manager**

### Configuration for integration in SIMATIC PCS 7 configuration environment

#### SIMATIC PDM PCS 7 V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with - SIMATIC PDM Basic incl. 4 TAGs

- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
  - SIMATIC PDM Routing
- 100 TAGs

Note: SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 V8.2!

- Delivery form package (without SIMATIC PCS 7 Software) Media Package)
  License key USB stick and certificate of license, bundled with 1 x SIMATIC PDM Software Media Package per ordering position
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes:

E-mail address required; installation software also available sepa-rately as SIMATIC PDM Software Media Package

## SIMATIC PDM PCS 7-FF V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with - SIMATIC PDM Basic incl. 4 TAGs

- SIMATIC PDM Extended
- SIMATIC PDM integration in
- STEP 7/PCS 7
   SIMATIC PDM Routing
   SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 TAGs

SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7-FF V8.2!

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes:

E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package

6ES7658-3LD28-0YA5

6ES7658-3LD28-0YH5

6ES7658-3MD28-0YA5

6ES7658-3MD28-0YH5

#### SIMATIC PDM PCS 7 Server V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

- Floating license for 1 user, with SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 TAGs

#### Note:

SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 Server V8.2!

- · Delivery form package Without SIMATIC PCS 7 Software (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license

Notes: E-mail address required: installation software also available sepa-rately as SIMATIC PDM Software Media Package.

6ES7658-3TD28-0YA5

6ES7658-3TD28-0YH5

Software

# SIMATIC PDM Process Device Manager

Optional product components for SIMATIC PDM V8.2  SIMATIC PDM Extended V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user  • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license  • Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note:	6ES7658-3NX28-2YB5 6ES7658-3NX28-2YH5	SIMATIC PDM Server V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user  • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick, certificate of license  • Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	6ES7658-3TX28-2YB5 6ES7658-3TX28-2YH5
E-mail address required!  SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V8.2 only required for integration of SIMATIC PDM into HW Config 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user  • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license  • Delivery form online (without SIMATIC PCS 7/SIMATIC	6ES7658-3BX28-2YB5 6ES7658-3BX28-2YH5	SIMATIC PDM Communication FOUNDATION Fieldbus V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license • Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	6ES7658-3QX28-2YB5 6ES7658-3QX28-2YH5
PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!  SIMATIC PDM Routing V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user  • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license  • Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download, online certificate of license Note:	6ES7658-3CX28-2YB5 6ES7658-3CX28-2YH5	SIMATIC PDM HART Server V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user • Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license • Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	6ES7658-3EX28-2YB5 6ES7658-3EX28-2YH5

Software

#### **SIMATIC PDM Process Device Manager**

#### SIMATIC PDM

Command Interface V8.2

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

 Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license

#### 6ES7658-3SX28-2YB5

#### SIMATIC PDM TAGS

TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user

- Delivery form package License key on USB stick and certificate of license
- 10 TAGs
- 100 TAGs
- 1 000 TAGs
- Delivery form online License key download and online certificate of license Note:

E-mail address required!

- 10 TAGs
- 100 TAGs
- 1 000 TAGs

6ES7658-3XC00-2YB5 6ES7658-3XD00-2YB5 6ES7658-3XE00-2YB5

6ES7658-3XC00-2YH5 6ES7658-3XD00-2YH5 6ES7658-3XE00-2YH5

#### SIMATIC PDM Software Media Package

#### SIMATIC PDM

Software Media Package V8.2

Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Note: Can only be used in conjunction with a valid license or in demo mode!

- Delivery form package (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software on DVD
- Delivery form online (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software download Note: E-mail address required!

6ES7658-3GX28-0YT8

6ES7658-3GX28-0YG8

#### More information

#### Update/Upgrade

Product packages and optional product components from the product range of SIMATIC PDM V6.0, V6.1, V8.0 or V8.1 (incl. service pack) can be directly upgraded to V8.2 using upgrade packages.

Product packages and optional product components from the product range of SIMATIC PDM V7.0 can first be upgraded to V8.0 and then to V8.2.

When upgrading to SIMATIC PDM V8.2, be aware of the compatible versions of SIMATIC PCS 7 and STEP 7.

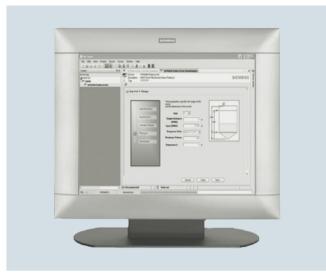
A Software Update Service in the form of a subscription is also offered for SIMATIC PDM.

For further information, see catalog ST PCS 7.

Software

#### SITRANS DTM

#### Overview



SITRANS DTM provides an easy way for Field Device Tool (FDT)/ Device Type Manager (DTM) users to parameterize Siemens Instruments using international standards.

#### Benefits

- Same look and feel for all Siemens field instruments.
- Support for Quick start wizards and other dialog boxes
- · Quick overview using table and tree views
- Online and offline configuration
- Conformity to IEC profiles for HART and PROFFIBUS

#### Application

Electronic Device Description (EDD) is a proven way to describe the behavior and functionality of field instruments and other automation components.

For many years, EDD-based tools such as SIMATIC PDM from Siemens or handheld communicator have been used successfully in the process industry. Some years ago, an additional technology called FDT / DTM with the same approach was introduced to the market. To support the FDT DTM Technology for Siemens devices, the software SITRANS DTM has been developed which combines both EDD and FDT technologies.

SITRANS DTM uses EDDs as the device description and provides the DTM interface to allow the integration of our field instruments into FDT-frame applications.

The following field instruments are currently available in SITRANS DTM:

- SITRANS TH300 HART
- SITRANS TH400 PA
- SITRANS P300 HART
- SITRANS P500
- SITRANS P DSIII HART
- SITRANS F M MAG 6000 DP/PA
- SITRANS F C MASS 6000 PA/PA
- SITRANS FC430
- SITRANS PROBE LU 6 m, 12 m, HART
- SITRANS LR200 HART, PA
- SITRANS LR250 HART, PA
- SITRANS LR260 HART, PA
- SITRANS LR560 HART, PA
- SITRANS LUT400 HART
- SIPART PS2 HART, PA, FF

#### Technical specifications

#### SITRANS DTM

#### Version

Current Version

Compatible with

PACTware versions

• Compatible with Windows

• Certified by FDT group

3.1 3.6, 4.0, 4.1

XP, 7 Yes

Free DTM software can be downloaded from: http://www.siemens.com/sitransdtm

Click on Support in the collateral list on the right side of the web page, and choose Software downloads.

Software

#### **SITRANS Library**

#### Overview



The SITRANS Library for SIMATIC PCS 7 V8.0 and higher extends standard functionality of the SIMATIC PCS 7 process control system concentrated in the SIMATIC PCS 7 Advanced Process Library (APL) with technological blocks and faceplates for device-specific functions of the SITRANS field devices.

#### Benefits

This allows you to easily operate all device functions, such as the dosing of the SITRANS FM MAG6000, in a single faceplate. In addition, it also supports operation and monitoring via Touch Panels as well as the integration in SIMATIC S7 applications. The SITRANS Library is based on the modern design of the Advanced Process Library (APL). Together with the APL, the SITRANS Library enables you to create harmonic solutions with a consistent look & feel and optimum use of the functions of the SITRANS field devices in many industries.

It helps accelerate the engineering process, reduces the time-to-market, and simplifies process control. In addition, operator functions (such as "Dosing") and process-related diagnostic information (such as empty pipe detection and flow direction) are provided.

Note:

SITRANS Library can be used in combination with SIMATIC PCS 7 version V8.0 and higher.

#### Application

The SITRANS Library can be used in combination with SIMATIC PCS 7 and SITRANS field devices.

You can find the current list of the SITRANS field devices and the supported SIMATIC PCS 7 versions at

http://support.automation.siemens.com//WW/view/en/85285872

The SITRANS Library can be used for all core sectors of the process industry. These are:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- · Glass and solar
- · Oil & gas
- Food and beverage industry
- · Minerals and mining

#### Design

The product structure, however, is geared toward the operational environment in the SIMATIC PCS 7 process control system. Consequently, SITRANS Library is offered in the form of an engineering component:

- SITRANS Library
   Engineering software with engineering license for one customer plant
- SITRANS Library Runtime license for one automation system (SIMATIC PCS 7 automation systems of all designs and S7-300 controllers)

The SITRANS Library product component enables you to perform configuration work on a SIMATIC PCS 7 engineering station.

The SITRANS Library product component allows you to run blocks from a library on an automation system.

When using function blocks from SITRANS Library in SIMATIC PCS 7 automation systems, note that SIMATIC PCS 7 AS Runtime POs are also booked.

#### Function

#### SITRANS Library for SIMATIC PCS 7

Sublibrary for the functional expansion of the SIMATIC PCS 7 Advanced Process Library with:

- Function blocks and faceplates for the SITRANS F M MAG 6000 DP with dosing function for SIMATIC S7-400, SIMATIC S7-300 and panel interface blocks
- Function blocks and faceplates for SITRANS field devices for SIMATIC S7-400 and SIMATIC S7-300 with WinCC.

The function blocks are configured in CFC.

Control and monitoring from a panel is configured with the panel interface blocks for example for the SITRANS F M MAG 6000 DP. Taking operating rights and hierarchical operating concepts (multi-control room operation) into consideration, the technological function can then be operated from both an operator station and a Touch Panel.

Detailed information for which field devices which systems and system versions are supported and about free-of-charge download see under:

http://support.automation.siemens.com/WW/view/en/85285872

#### Selection and Ordering Data

Article No.

#### **SITRANS Library**

Block library for SIMATIC PCS 7 V8.0 and higher and SIMATIC S7 with function blocks and face plates as well as electronic documentation

Engineering software, software class A, two languages (English, German), runs under opreation system Windows XP Professional 32 Bit, Windows 7 Ultimate 32/64 Bit, Windows Server 2003 R2 Standard 32 Bit or Windows Server 2008 R2 Standard 64 Bit, single license for 1 installation

Engineering license for one customer plant.
 Delivery form: can be downloaded, with certificate of license

7MP2990-0AA00

# Appendix





<b>9/2</b> 9/3	SITRAIN - Training for Industry Course offer for Process Instrumentation
9/4	PIA Life Cycle Portal Engineering, Ordering, Installation and Operation Tool
9/5	Delivery time
9/6	Pressure Equipment Directive (97/23/EC)
9/9	Functional safety
9/10	Partner at Siemens
9/11	Siemens Automation Cooperates with Education Simplify your education in automation
9/13 9/14	Online Services Information and Ordering in the Internet and on DVD Information and Dowload Center, Social Media, Mobile Media
9/15 9/16	Industry Services Your machines and plants can do more – with Industry Services Industry Services for the entire life cycle
9/20	Software Licenses
9/22	Conditions of sale and delivery

#### **Appendix**

#### SITRAIN - Training for Industry

# You benefit from practical training provided directly by the manufacturer

SITRAIN – Training for Industry – provides you with comprehensive support in solving your tasks.

Training directly from the manufacturer enables you to make better choices with more confidence in your decision-making processes.

#### SITRAIN Training means:

- Shorter times for commissioning, maintenance and servicing
- Optimized production operations
- · Reliable configuration and startup
- Shorter start-up times, reduced downtimes and faster fault clearance
- Swift elimination of deficits in existing plants
- · Avoidance of costly planning errors right from the start
- Flexible plant adaptation to market requirements
- · Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff



#### Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

# SITRAIN – Training for Industry Customer Support Germany:

Phone: +49 911 895-7575 Fax: +49 911 895-7576 E-mail: info@sitrain.com



#### Important key data

#### Top trainers

Our trainers are skilled specialists with direct and extensive practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers, who can then in turn teach more effectively.

#### Practical experience

Practice makes perfect – that's why we attach the greatest importance to hands-on learning. Practical exercises can comprise up to half of the course time. You can therefore immediately implement your new knowledge in your day-to-day work situations.

#### 300 courses in 62 countries

We offer a total of about 300 local attendance courses. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. To find out which course is held at which location, go to:

www.siemens.com/sitrain

#### Customized training

Would you prefer individual training instead? Our solution: We will provide a program tailored exactly to suit your personal requirements. Training can be carried out in our Training Centers or onsite at your company.

We instruct you using state-of-the-art training equipment which has been especially designed by our developers for the SITRAIN courses. This training approach will give you all the assurance you need.

#### The right mixture: Blended learning

Blended learning involves a combination of various training media. For example, a face-to-face course in a training center can be optimally supplemented by teach-yourself Web-based training (WBT) courses as preparation or follow-up. The add-on effect: Reduced traveling costs and periods of absence.



9/2

# **Appendix** SITRAIN – Training for Industry

# Course offer for Process Instrumentation

# Course offer

	Course suitable for				
	Planning	Reali- zation	Operation	Duration/ Medium	Course code
Basis Service Training for Process Instruments	~	~	~	5 days	SC-PI-BST
WirelessHART Basic Training (for Siemens employees)	~	~	V	2 days	SC-PI-WHB
Introduction into Process Instrumentation and Process Analytics (for Siemens employees)	~	~	V	2 days	SC-TP-GS1
Advanced Trainings PS1 Pressure, Temperature and Positioner (for Siemens enployees)	~	~	<b>V</b>	3,5 days	SC-PI1-ADV
Pressure-, Temperature Measurement and Electropneumatic Positioners - Technology and Sales	~	~	V	4,5 days	SC-PI1-T1S
2 days Training Pressure and Temperature	~	~	~	2 days	SC-PI1-PT
PI3 Advanced Service-Training - COMPLETE		~	~	10 days	AST-ALL
PI3 Advanced Service-Training - Communication		V	~	1 day	AST-COM
PI3 Advanced Service-Training - MASS		~	~	1 day	AST-FC
PI3 Advanced Service-Training - FC430		~	~	1 day	AST-FC400
PI3 Advanced Service-Training - MAG		~	~	1 day	AST-FM
PI3 Advanced Service-Training - MAG 8000		~	~	1 day	AST-FM8000
PI3 Advanced Service-Training - Transmag		~	~	1 day	AST-FMT
PI3 Advanced Service-Training - ClampOn		~	~	1 day	AST-FUC
PI3 Advanced Service-Training - SONO Inline		~	~	1 day	AST-FUI
PI3 Advanced Service-Training - SONOKIT		~	~	1 day	AST-FUK
PI3 Advanced Service-Training - Vortex		~	~	1 day	AST-FX
Flow Measurement - Technology and Sales	~	~	~	5 days	SC-PI3-T1S
Level Measurement - Technology and Sales	~	~	~	4 days	SC-PI2-T1S
Siemens Weighing Technolgy, Basic Training (for Siemens employees)	~	~	~	2 Tage	SC-WT-BAS
Static Weighing Technology	~	~	~	4 days	SC-WT-STAT
Dynamic Weighing Technology	~	~	~	3 days	SC-WT-DYN
SIWAREX Sensor System and Electronics FTC-L		~	~	3 days	SC-WT-FTCL
Weighing Technology, Belt Scales, Weighfeeder		~	V	3 days	SC-WT-BELT
SIWAREX WP231	V	~	V	1 day	SC-WT-WP23

#### **Appendix**

PIA Life Cycle Portal

#### **Engineering, Ordering, Installation and Operation Tool**

#### Overview



The PIA Life Cycle Portal provides the appropriate functionality in all stages of the Product Life Cycle for products of Process Instrumentation, Process Analytics and Weighing Technology.

The application guides you through Engineering & Selection, supports you at the Order and provides tools and information for Installation and Operation.

- Phase 1: Selection & Planning
- Phase 2: Ordering
- Phase 3: Installation & Operation
- Additional features: e. g. PIA Mobile

#### Phase 1: Selection & Planning



#### Selection

Achieve product solutions that meet your requirements by specifying relevant parameters according to the measuring point by using the guided selection or select the product directly in the product and accessories tree.



#### Configuration

Configure a selected product step by step and use the integrated configuration knowledge to avoid errors.



#### Sizing & calculation

Sizing & calculation tools for Gas Analyzers, Weighing and Batching Systems and Flow measurement instruments.

#### Phase 2: Ordering



#### Bulk upload

Verify several part numbers in one step by uploading a simple text file.



#### Watchlist & projects

Collect products in a watch list and save it as a project for later use.



#### Interface to the Industry Mall

Order the selected products with the ordering system for Siemens' automation and drive solutions.

#### Phase 3: Installation & Operation



#### Spare parts

Find appropriate *spare parts* for selected products or corresponding product families.



#### After sales support

Go to the *Service and Support Portal* to access manuals, certificates and further information concerning service & support.



#### Device information and history

Serial number specific product information for installed devices

#### Additional features



#### Personalize

Register in order to customize the application to your personal needs.



#### PIA Mobile

Use the product *selection, configuration* and device information and history with the version optimized for mobile devices. www.siemens.com/piamobile



#### Product details

Find all relevant product information at a single glance: commercial and technical data, certificates, images and documents

#### More information

PIA Life Cycle Portal Ostliche Rheinbrückenstraße 50 76187 Karlsruhe, Germany

Tel.: +49 (721) 595 2114

E-Mail: support.pia-portal@siemens.com

www.siemens.com/pia-portal

#### Overview

#### Fast Delivery Time

Our devices are anything but products off the rack. Numerous customer requirements can be taken into account when configuring any of our products. This results in large variety.

In the selection and ordering data, we show you how to use various identifiers to locate the products from our standard portfolio and stock items.

#### Quick Ship Programm

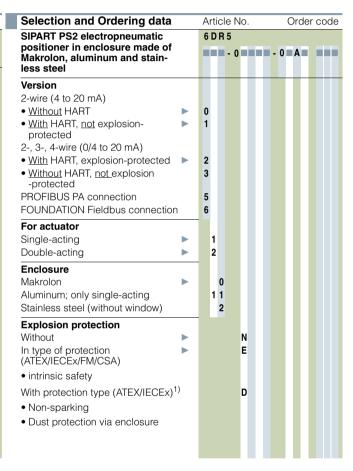
#### Selection and Ordering data Article No. Pressure transmitters for absolute pressure 7MF4233from gauge pressure series, SITRANS P DS III with HART Measuring cell filling Measuring cell cleaning Silicone oil normal grease-free to 3 Inert liquid cleanliness level 2 Measuring span (min. ... max.) 8.3 ... 250 mbar a (0.12 ... 3.62 psia) D 43 ... 1300 mbar a (0.62 ... 18.85 psia) • 0.16 ... 5 bar a (2.32 ... 72.5 psia) G 1 ... 30 bar a (14.5 ... 435 psia) Н Wetted parts materials Seal diaphragm Process connection Stainless steel Stainless steel d Hastelloy Stainless steel В Hastelloy Hastelloy С Version for diaphragm seal **Process connection** • Connection shank G1/2B to EN 837-1 0 • Female thread 1/2-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) - Mounting thread $^7/_{16}$ -20 UNF to EN 61518 2 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 4 • Male thread M20 x 1.5 5 Male thread ½ -14 NPT 6 Non-wetted parts materials 0 Housing made of die-cast aluminium • Housing stainless steel precision casting

Housing stainless steel precision casting
 Ordering options with the ● identifier refer to products from our Quick Ship Program. If you combine only ordering options that

are marked with a , these product variants can be produced

and delivered within 5 to 15 days in limited quantity.

#### Stock Items



Ordering options with the identifier refer to stock items. If you combine only ordering options that are marked with a identifier refer to stock items. If you combination can be ordered from stock. If your order quantity is available from stock, your order usually leaves the warehouse within one day.

#### Contact

If you have questions about delivery time or the Quick Ship program, please contact your Siemens sales representative.

#### **Appendix**

#### Pressure Equipment Directive (97/23/EC)

#### General

The pressure equipment directive **97/23/EC** applies to the alignment of the statutory orders of the European member states for pressure equipment. Such equipment in the sense of the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than **0.5 bar** above atmospheric.

The pressure equipment directive can be used starting November 29, 1999, and is compulsory starting May 29, 2002.

#### Division according to the danger potential

Equipment is divided in line with the pressure equipment directive according to the danger potential (medium/pressure/volume/nominal diameter) into the categories I to IV or Article 3 Paragraph 3.

The following criteria are decisive for assessment of the danger potential, and are also shown in Diagrams 1 to 4 and 6 to 9:

• Fluid group

• Aggregate state

• Type of pressurized equipment

- Vessel

- Pipeline

Group 1 or 2

Liquid or gaseous

Product of pressure and volume (PS \* V [barL])

Nominal diameter, pressure or product of pressure and nominal diameter (PS \* DN)

Fuelled pressure equipment or equipment heated in another manner are shown separately in Diagram 5.

#### Note:

Liquids according to Article 3 are those liquids whose steam pressure is **not** more than **0.5 bar** above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The **maximum permissible temperature** for the used liquids is the maximum process temperature which can occur, as defined by the user. This must be within the limits defined for the equipment.



#### Division of media (liquid/gaseous) into the fluid groups

Fluids are divided according to Article 9 into the following fluid groups:

#### Group 1



#### **Explosive**

R phrases: e.g.: 2, 3 (1, 4, 5, 6, 9, 16, 18, 19, 44)



#### Very toxic

R phrases: e.g.: 26, 27, 28, 39 (32)



# Extremely flammable

R phrases: e.g.: 12 (17)



#### Toxic

R phrases: e.g.: 23, 24, 25 (29, 31)



# Highly flammable

R phrases: e.g.: 11, 15, 17 (10, 30)



#### Oxidizing

R phrases: e.g.: 7, 8, 9 (14, 15, 19)

Flammable (where the maximum allowable temperature is above flash-point)

#### Group 2

All fluids not belonging to Group 1.

Also applies to fluids which are e.g. dangerous to the environment, corrosive, dangerous to health, irritant or carcinogenic (if not highly toxic).

#### Conformity rating

Pressure equipment of categories I to IV must comply with the safety requirements of the directive and be assigned the CE symbol.

They must comply with a conformity rating procedure according to Appendix III of the directive.

Pressure equipment according to Article 3 Paragraph 3 must be designed and manufactured in agreement with the sound engineering practice SEP applying in a member country, and must not be assigned a CE symbol (CE symbols from other directives are not affected).

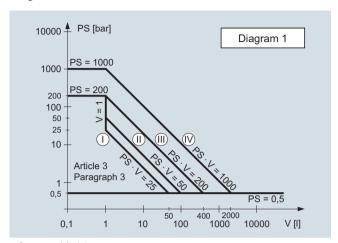
Siemens has carried out a conformity rating, assigned a CE symbol, and issued a declaration of conformity for its products (providing the equipment is not within the context of Article 3 Paragraph 3).

Supervision of the design, dimensioning, testing and manufacture is carried out according to module H (comprehensive quality assurance).

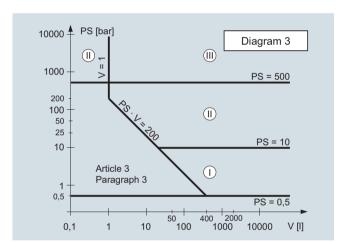
#### Notes:

- Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).
- The pressure equipment directive according to Article 1 Paragraph 1 does not apply to equipment such as e.g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

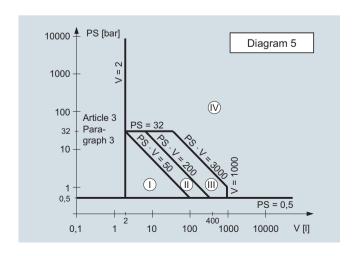
#### Diagrams

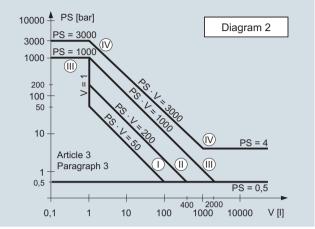


- Gases of fluid group 1
- Vessels according to Article 3 Number 1.1 Letter a) First dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.

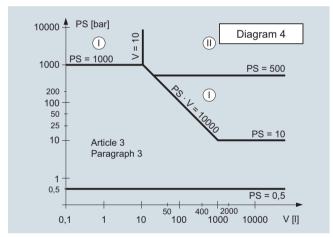


- Liquids of fluid group 1
- Vessels according to Article 3 Number 1.1 Letter b) First dash





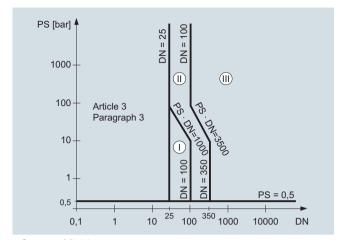
- Gases of fluid group 2
- Vessels according to Article 3 Number 1.1 Letter a) Second dash
- Exception: fire extinguishers and bottles for breathing apparatus: at least Category III.

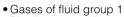


- Liquids of fluid group 2
- Vessels according to Article 3 Number 1.1 Letter b) Second dash
- Exception: modules for producing warm water

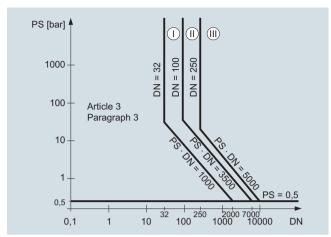
- Fuelled pressure equipment or equipment heated in another manner above 110 °C and liable to overheating.
- Vessel according to Article 3 Number 1.2
- Exception: pressure cooker, test procedure at least according to Category III.



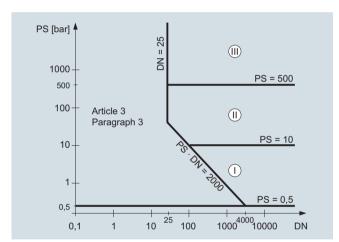




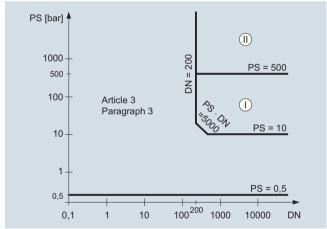
- Pipelines according to Article 3 Number 1.3 Letter a) First dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



- Gases of fluid group 2
- Pipelines according to Article 3 Number 1.3 Letter a) Second
- Exception: liquids at temperatures > 350 °C belonging to Category II must be included in Category III.



- Liquids of fluid group 1Pipelines according to Article 3 Number 1.3 Letter b) First dash



- Liquids of fluid group 2
- Pipelines according to Article 3 Number 1.3 Letter b) Second dash

#### Overview



#### Functional safety

Functional safety is a strong tradition at Siemens. Werner von Siemens realized as early as 1880 that safety in automated processes is not only a human obligation, it also makes economic sense. In the process industry, hazards for humans, plants and the environment must be minimized without affecting the production process. With Safety Integrated for Process Automation from Siemens, you benefit from a comprehensive product and service offering for safe, fault-tolerant applications.

#### What is the Safety Integrity Level (SIL)?

The Safety Integrity Level is a term from the field of functional safety. It helps you assess electrical/electronic/programmable electronic systems in terms of the reliability of their safety functions. The goal is to minimize the risk of malfunction of the system and thereby increase the protection of the employed personnel, the environment and property.

The international standard IEC 61508 describes the type of risk assessment as well as measures for designing appropriate safety functions ranging from sensors, logic processing and extending to actuators. The requirements for the process industry are further specified in IEC 61511-1.

Since the standards IEC 61508 and IEC 61511 for functional safety have been in effect, the demand for process instrumentation equipment conforming to SIL classification has continually increased. For this reason, the product portfolio is constantly expanded to include devices that meet the SIL standard.

You will find the current list of SIL devices from Siemens for process instrumentation available today at:

www.siemens.com/SIL

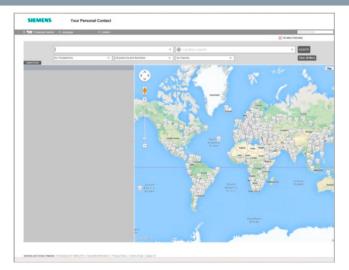
#### Additional information

Brochure: "Functional Safety in Process Instrumentation with SIL Rating"

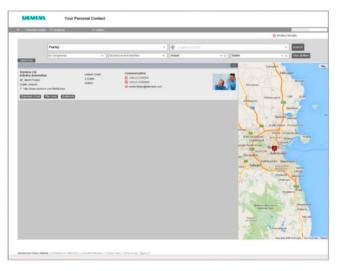
http://www.automation.siemens.com/w1/efiles/automation-technology/pi/SIL/SIL\_Broschuere\_en.pdf

Website: "Functional Safety"

http://www.industry.siemens.com/topics/global/en/safety-integrated







At Siemens Industry we are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: www.siemens.com/automation/partner

You start by selecting

- the required competence,
- products and branches,
- a country,
- a city

or by a

- location search or
- person search.

#### Unique support for educators and students in educational institutions

# Cooperates with Education



#### Automation

#### Siemens Automation Cooperates with Education (SCE)

offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

#### Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- · Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

#### Training curriculums for your lessons



Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

#### Particular highlights:

 With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.  The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

www.siemens.com/sce/documents

#### Trainer packages for hands-on learning



Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offers more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/SIMOTION
- CNC programming with SinuTrain

#### Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

#### **Appendix**

Siemens Automation Cooperates with Education

#### Simplify your education in automation

#### Unique support for educators and students in educational institutions (continued)

#### Courses convey up-to-date specialist knowledge



Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

www.siemens.com/sce/contact

#### Support for your projects/textbooks



Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact www.siemens.com/sce/books

#### Complete didactic solutions



Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

#### Contact for individual support

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

#### SCE Support Finder for your Internet request

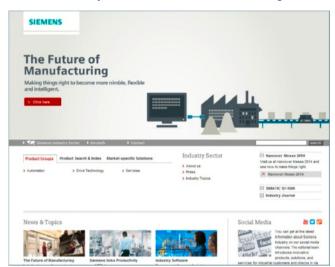
You are an educator and need support on the topic of industry automation? Send us your request:

www.siemens.com/sce/supportfinder

Scan the QR code for further information (SCE homepage)



## Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

#### www.siemens.com/industry

you will find everything you need to know about products, systems and services.

## Product Selection Using the Interactive Catalog CA 01 of Industry



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

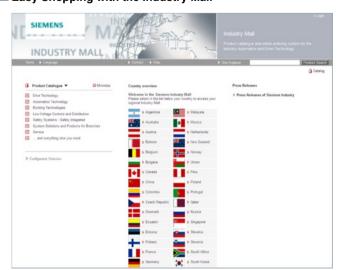
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

### Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking and tracing of the order to be carried out. Availability checks, customer-specific discounts and preparation of quotes are also possible.

Numerous additional functions are available to support you.

For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

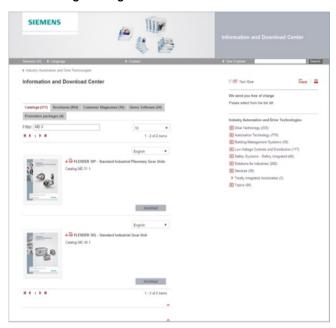
Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

Online Services

#### Information and Download Center, Social Media, Mobile Media

#### Downloading Catalogs



In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

www.siemens.com/industry/infocenter

#### Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

www.siemens.com/industry/socialmedia

Or via our product pages at:

www.siemens.com/automation

or

www.siemens.com/drives

To find out more about Siemens' current social media activities visit us at:

www.siemens.com/socialmedia

## Mobile Media





Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

# **Appendix** Industry Services

## Your machines and plant can do more – with Industry Services.

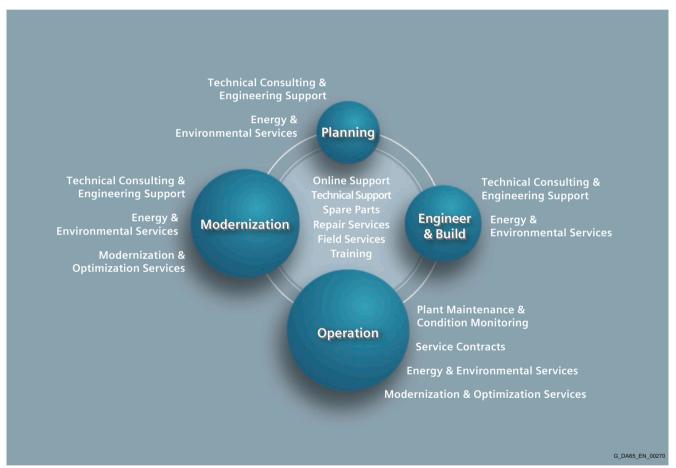


Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio: www.siemens.com/industry-services



Siemens supports its clients with technology based Services across a plants entire life cycle.

## Industry Services for the entire life cycle

#### Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediabased – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



www.siemens.com/industry/onlinesupport

#### Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under

"mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code for information on our Online Support app.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

www.siemens.com/industry/onlinesupportapp

#### **Technical Support**

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by email, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.



# **Appendix** Industry Services

Industry Services for the entire life cycle

#### Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill - and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



#### Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



#### Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.



**Industry Services** 

#### Industry Services for the entire life cycle

## Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN — Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



#### **Technical Consulting & Engineering Support**

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



#### **Energy & Environmental Services**

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.



# **Appendix** Industry Services

Industry Services for the entire life cycle

#### **Modernization & Optimization Services**

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation



#### Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



#### Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



#### Software Licenses

#### Overview

#### Software types

Software requiring a license is categorized into types. The following software types have been defined:

- · Engineering software
- Runtime software

#### Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

#### Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

#### License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- · Rental floating license
- Trial license
- Demo license
- · Demo floating license

#### Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.

A license is required for each concurrent user.

#### Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

#### Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

#### Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

#### Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

#### Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

#### Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

#### Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

#### Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

#### **Delivery versions**

Software is constantly being updated. The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

#### **PowerPack**

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

#### Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

## Overview

#### ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

#### License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

## Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms\_of\_trade\_en.pdf

#### Conditions of sale and delivery

## 1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

## 1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment" and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany" and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"<sup>1)</sup>.

## 1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment" and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany" 1) and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany" 1).

## 2. Prices

The prices are in  $\in$  (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charget the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

 $www.siemens.com/automation/salesmaterial-as/catalog/en/terms\_of\_trade\_en.pdf$ 

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

#### 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

## 4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i .a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at

 $www.siemens.com/automation/sales material-as/catalog/en/terms\_of\_trade\_en.pdf$ 

## Catalogs

## Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices listed at www.siemens.com/automation/partner

System Solutions for Industry Interactive Catalog on DVD	Catalog	Low-Voltage Power Distribution and Electrical Installation Technology	Catalog
Products for Automation and Drives, Low-Voltage Power	CA 01	SENTRON · SIVACON · ALPHA	LV 10
Distribution and Electrical Installation Technology	CAUI	Protection, Switchboards and Distribution Systems	LV 10
Building Control	ET 04	Standards-Compliant Components for Photovoltaic Plants	LV 11
SAMMA Building Control	ET G1		11/ 10
Drive Systems		Electrical Components for the Railway Industry	LV 12 <i>LV 14</i>
SINAMICS G130 Drive Converter Chassis Units	D 11	Digital: TÜV-certified Power Monitoring System  Components for Industrial Control Panels according	LV 14 LV 16
SINAMICS G150 Drive Converter Cabinet Units		to UL Standards	
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12	3WT Air Circuit Breakers up to 4000 A	LV 35
SINAMICS PERFECT HARMONY GH180  Medium-Voltage Air-Cooled Drives	D 15.1	3VT Molded Case Circuit Breakers up to 1600 A  Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning	LV 36 <i>LV 50</i>
Germany Edition		, o	11/51
SINAMICS G180	D 18.1	Digital: ALPHA Distribution Systems	LV 51
Converters - Compact Units, Cabinet Systems,		ALPHA FIX Terminal Blocks	LV 52
Cabinet Units Air-Cooled and Liquid-Cooled		SIVACON S4 Power Distribution Boards	LV 56
SINAMICS S120 Chassis Format Units and	D 21.3	SIVACON 8PS Busbar Trunking Systems	LV 70
Cabinet Modules SINAMICS S150 Converter Cabinet Units	_	Digital: DELTA Switches and Socket Outlets	ET D1
SINAMICS DCM DC Converter, Control Module	D 23.1	Motion Control	
SINAMICS DCM Cabinet	D 23.2	SINUMERIK & SIMODRIVE	NC 60
SINAMICS Inverters for Single-Axis Drives and	D 31	Automation Systems for Machine Tools	
SIMOTICS Motors		SINUMERIK & SINAMICS	NC 61
SINAMICS G120P and SINAMICS G120P Cabinet	D 35	Equipment for Machine Tools	
oump, fan, compressor converters		SINUMERIK 840D sl Type 1B	NC 62
hree-Phase Induction Motors SIMOTICS HV,	D 84.1	Equipment for Machine Tools	
SIMOTICS TN		SINUMERIK 808	NC 81.1
Series H-compact		Equipment for Machine Tools	
Series H-compact PLUS		SINUMERIK 828	NC 82
Asynchronous Motors Standardline	D 86.1	Equipment for Machine Tools	
Synchronous Motors with Permanent-Magnet echnology, HT-direct	D 86.2	SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines	PM 21
DC Motors	DA 12	Drive and Control Components for Cranes	CR 1
SIMOREG DC MASTER 6RA70 Digital Chassis	DA 21.1	<u> </u>	
Converters		Power Supply	
SIMOREG K 6RA22 Analog Chassis Converters Digital: SIMOREG DC MASTER 6RM70 Digital	DA 21.2 DA 22	Power supply SITOP	KT 10.1
Converter Cabinet Units		Safety Integrated	
SIMOVERT PM Modular Converter Systems SIEMOSYN Motors	DA 45 DA 48	Safety Technology for Factory Automation	SI 10
MICROMASTER 420/430/440 Inverters	DA 51.2	SIMATIC HMI/PC-based Automation	
MICROMASTER 411/COMBIMASTER 411	DA 51.3	Human Machine Interface Systems/	ST 80/
SIMODRIVE 611 universal and POSMO  Note: Additional catalogs on SIMODRIVE or SINAMICS	DA 65.4	PC-based Automation	ST PC
drive systems and SIMOTICS motors with SINUMERIK		SIMATIC Ident	
and SIMOTION can be found under Motion Control		Industrial Identification Systems	ID 10
Low-Voltage Three-Phase-Motors	D 01 1	SIMATIC Industrial Automation Systems	
SIMOTICS Low-Voltage Motors	D 81.1	SIMATIC Industrial Automation Systems  Products for Totally Integrated Automation	OT 70
SIMOTICS FD Flexible Duty Motors	D 81.8	Products for Totally Integrated Automation	ST 70
OHER Low-Voltage Motors	D 83.1	SIMATIC PCS 7 Process Control System	ST PCS 7
MOTOX Geared Motors	D 87.1	System components	OT DOO 7 T
SIMOGEAR Geared Motors	MD 50.1	SIMATIC PCS 7 Process Control System	ST PCS 7 T
SIMOGEAR Gearboxes with adapter	MD 50.11	Technology components	OT DOO 7 4
Mechanical Driving Machines EENDER Standard Couplings	MD 10.1	Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7 A
FLENDER High Performance Couplings	MD 10.1	OWATIO NET	
FLENDER SIG Standard industrial gear units	MD 30.1	SIMATIC NET	
FLENDER SIP Standard industrial planetary gear units	MD 31.1	Industrial Communication	IK PI
		SIRIUS Industrial Controls	
Process Instrumentation and Analytics		SIRIUS Industrial Controls	IC 10
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## Get more information

All the latest information on field instruments for process automation can be found on the internet at www.siemens.com/processinstrumentation

## **Industrial Security**

Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates. Please find further information and newsletters on this subject at: http://support.automation.siemens.com

To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account. Please find further information at:

http://www.siemens.com/industrialsecurity

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